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588.  
FINAL REPORT

ON THE

**RADICAL CURE OF HERNIA,**

BY THE COMMITTEE OF THE PHILADELPHIA MEDICAL SOCIETY.

Dr. R. COATES completed the reading of the Report of the Committee on the Radical Cure of Hernia, when, on motion,

Resolved, That the same be accepted and the Committee be discharged, and that the thanks of the Society be tendered to the Committee for the able and elaborate manner in which they have attended to the duties of their appointment.

Resolved, That a Committee of Two be appointed to request the publication of the Report of the Committee on the Radical Cure of Hernia in the *American Journal of the Medical Sciences*.

The Committee appointed by the Philadelphia Medical Society, at the session of the 27th of December, 1834, with directions to investigate the character of Stagner's Truss, and other proposed means of radical cure of Hernia, respectfully

REPORT:

That since the date of their Preliminary Report, (read Dec. 5th and 12th, 1835,) they have devoted much time and thought to the important investigation submitted to their charge; but the numerous mooted questions originally involved with it, have been gradually narrowed down in number and compass, in three different ways; firstly, by the decision of several physiological points; secondly, by the results of the analysis of the mechanical construction of instruments; and thirdly, by the introduction of improvements in the formation of trusses, calculated to remove the objections waged against some portion of the apparatus represented as imperfect in the preliminary report.

In offering to the society the conclusions deduced from the observations of the committee, it is deemed unnecessary to enter at length into *all the evidence upon which those conclusions have been founded*, for much of this matter is already before the public in a form sufficiently authentic, and accessible for every useful purpose; and the attempt to include the whole, would swell this report beyond all reasonable or necessary limits. Reference will, therefore, be freely made to the following documents, which have been produced and published in consequence of the investigations of the committee: 1st. The Preliminary Report, published in the *American Journal of the Medical Sciences*, Vol. XVII. p. 307. 2nd. Note of R. COATES, M. D., on two new Hernial Blocks. Ibid, 543. 3d. Letter from the same gentleman to HEBER CHASE, M. D., in reply to a note of the latter, on the *modus operandi* of instruments in Dr. CHASE's Treatise on the Radical Cure of Hernia by Instruments. Philadelphia, 1836.

Reference will be also made occasionally to the mechanical reasonings and the detailed cases contained in the work just mentioned.

In the eighth section of the Preliminary Report, (Op. cit. p. 324) the Committee ventured upon a physiological disquisition on the *modus operandi* of trusses, in producing *the apparently radical cure of Hernia*; and their conclusion on this subject was presented in the following sentence.

"These positions will explain the motive of the Committee in taking the ground, that the most perfectly retentive apparatus is that which offers the strongest probability of radical cure, and that any considerable irritation produced in the parts by the pressure of a block, may be considered, in the present state of the investigation, of secondary importance."—p. 326.

In the letter of the chairman to Dr. HEBER CHASE, to which reference has been already made, the question of the *modus operandi* has been argued at greater length than would have been proper in a report designed to present a rigid detail of facts and established deductions; but the tenor of that letter, written after much more extended observation than had been offered when the report was read, adds collateral support to the present opinions of the Committee, founded upon the whole of the evidence before them; namely, that the *radical cure of hernia*, by trusses, depends almost exclusively, if not entirely, upon the accuracy and permanency of the retention effected by the instrument. That considerable or long continued irritation in the parts, so far from being an advantage, in reality opposes the successful treatment; that there are no facts in their possession which tend to prove indisputably that even slight irritations of the superficial tissues are transmitted to the tendons of the abdominal muscles in such a manner as to accelerate the cure; and that radical cures are sometimes effected without any other irritations than such as are altogether fugitive in character.

It will be remembered by the Society that the Committee, in the Preliminary Report, expressed the decided opinion that "the retentive power of solid blocks exceeds, *ceteris paribus*, by considerable difference, that of pads composed of softer materials."

The whole current of the evidence since presented to them most fully substantiates the correctness of this position, as the number of cases has been large in which the various instruments with soft pads have failed in effecting accurate and permanent retention, and in which the more perfect apparatus with blocks of proper form have been substituted with complete success.

It has been deemed unnecessary to preserve voluminous records of the multitude of cases presented, at different times, before the individuals comprising the Committee, which proved the superior retentive powers of the trusses with solid blocks, but which could not be subjected to frequent examination, on account of the fastidiousness of patients, or the distance of their residences; but sufficient evidence on this head will be found among the detailed observations appended to the former and the present reports. Nor is it esteemed desirable to burden the Society with a laboured analysis of the mechanical defects in the form, material, and mode of attachment presented by the several descriptions of trusses in use prior to the introduction of the contrivance of Mr. Stagner; defects in nearly every instance removed by more recent improvements. This subject has been ably discussed in the fourth chapter of Dr. CHASE's work. The problems involved in it are chiefly of a mechanical character, and all members of the profession



who are at all familiar with the exact sciences are therefore equally competent judges of the correctness of the demonstrations. There has been no evidence presented to lead the Committee into any change of opinion as to the impropriety of substituting firm but elastic materials for the absolute solids in the construction of the armature of trusses. The employment of caoutchouc (of which truss-pads are sometimes constructed) as a direct and permanent application to the skin, has been fully proved to be altogether inadmissible. The proofs of this fact were thrown before the society in a recent lecture, a notice of which will be found in the American Journal of Medical Sciences, XIX. 550; and the Committee will merely add that the irritating effects of this substance are so well known in the neighbourhood of the caoutchouc cloth manufactory, near this city, that it is extensively employed there as a popular remedy in cases of chronic rheumatism.

These remarks have been premised, in order to explain the motives of the Committee in confining their report exclusively to the consideration of the action of trusses with solid blocks in place of pads. Their observation has been extended over a much wider field, but they deem it inexpedient to occupy the time of the Society with an account of the defects of various apparatus which have been so fully analyzed by others that the merits and demerits may be now considered as fairly before the public.

The trusses with solid blocks, now in use or recommended by inventors, may be divided into two classes. 1st. Those which are constructed for the express purpose of producing irritation, in order to effect a condensation of the skin, cellular tissue, and the fascia superficialis or the abdominal tendons about the hernial orifice, into one common mass by adhesion. 2nd. Those which are designed to secure the constant, perfect and safe retention of the bowel, without the attempt to create intentional irritation in the parts pressed by the instrument.

The first class includes the truss of Stagner, and the various apparatus of Dr. Hood for the treatment of common inguinal, ventro-inguinal, femoral and umbilical hernia.

Your Committee are not assured whether the several conoidal truss-blocks of lead, tin, or other metals, of which that attached to the strap and buckler known as Price's Truss (*see CHASE on Hernia*, p. 59, figs. 9, 10, 11, 12,) may be taken as the type, and the truss which bears the name of Sample's patent, as the least objectionable, were intended or not, by their inventors, to produce adhesions between the skin and parts beneath; but as they undoubtedly act in a manner better calculated to produce irritation than either of the other forms, they are most naturally arranged in this class.

The second class contains the old and well known instrument introduced to the notice of the Society by Dr. PERRINE, during the debate which followed the presentation of the Preliminary Report in 1835.

This instrument, known under the name of Eberle's, or the Ratchet Truss, was alluded to in the report, when ivory truss-blocks were mentioned; but the specimen presented to the society by Dr. PERRINE was armed by a wooden block; and although the committee were not previously assured that wood had been employed in the construction of truss-blocks prior to its employment by Mr. Stagner, they have since ascertained that it has been in use for twenty years, and probably for a much longer period.

This class also embraces all the instruments invented by Dr. CHASE, which are five in number, and will be spoken of in detail hereafter.

The remarks of the Committee on the first of these classes, naturally arrange themselves under two heads. 1st. Comments upon the supposed establishment of adhesive inflammation; and 2ndly. An estimate of the retentive power of the apparatus.

First then, on the establishment of adhesive inflammation by trusses of the first class. Your Committee have watched, with great caution and most minutely, the changes produced by the pressure of the truss-blocks in a number of cases; and the result of their observations may be summed up as follows: The application of the instrument soon produces an erythematous blush of the integuments, which, when the pressure is severe, often continues for weeks or months; but, when mild from the first, or rendered so at a later period by the substitution of an instrument with a weaker spring, the redness of the skin changes its character, and appears, on the removal of the instrument, like that simple result of capillary distension which is witnessed immediately on the removal of a tight bandage, wherever it may have been applied; a distension obviously produced by diminished action of the arcuated fibres and coats of the vessels, the tonic contraction of which has been rendered unnecessary for a time by the substitution of a mechanical support, the capillaries being thus incapacitated for resisting completely the vis a tergo of the arterial circulation and the hydrodynamic pressure of the venous column. This cause being more permanent during the use of the truss than during that of almost any ordinary bandage, the consequences are also more durable; and this second kind of redness, or purpleness, is sometimes observable for many days after the removal of the instrument.

The first of these forms of redness is the obvious effect of the superficial irritation produced by the pressure of the block, and may be called, with some propriety, the primary redness; the second is seen even after the parts have become accustomed to the presence of the instrument, and we shall take the liberty of calling it the secondary redness.

The form of hyperemia observed in the primary redness is known to be favourable to adhesion, if the irritation be not sufficiently intense to produce decided inflammation; and even when inflammation does supervene, if the constitution of the patient be good, the inflamed part will be surrounded by cellular adhesions, or depositions usually so called, designed to limit its progress, according to a well known physiological law.

The primary redness, during the use of the trusses of the first class, is often carried to such an excess as to produce decided inflammation, and sometimes even excoriation of the skin. (Case X.) It becomes, then, a question of considerable importance to decide whether the irritation of the block, or that produced by the inflammation which it sometimes causes, ever be transmitted to deeper seated parts so as to bring about adhesion between the cutis-vera, the subcutaneous cellular tissue, and the fascia superficialis. The conclusion on this point will be stated presently.

The form of hyperemia as seen in the secondary redness, marks a condition of the vessels, which, instead of promoting adhesion, is well known to retard the formation of false membranes, while it promotes absorption to such a degree as frequently to determine the solution of such as are already formed, together with the interstitial deposits of tissues and sometimes even the tissues themselves.

If, then, these adhesions and condensations do occur, which are repre-



sented by the hypothesis as the cause of cure by these trusses, the evidence of their existence should be found during the continuance of the primary redness, and cannot be supposed to *commence* at a later period, when the parts have become familiarized to the pressure of the instrument.

Immediately after the application of a truss of the first class, the subcutaneous fat beneath the block begins to disappear by absorption, especially at the part corresponding with the shoulder or most prominent part of the block. After the disappearance of the adeps, the block still continues to sink deeper and deeper, until, in fleshy persons, it appears to be almost embedded; and, on removing the instrument, the integuments present a mould of the block, nearly or quite complete. This condition is observed before the subsidence of the primary redness in some cases, (Case XII.) and in others the parts may possibly become accustomed to the pressure before the depression of the integuments is so strongly marked; but in fact it has been observed in practice that active irritation of the skin is generally reproduced from time to time, being complicated with the secondary debility of the vessels already described; or, in other words, *the skin rarely becomes perfectly accustomed to the pressure of blocks of this class.*

The tenor of the specifications of the patents of Dr. Hood and Mr. Stagner, (the only authorities on the subject known to the Committee,) induces us to believe that the authors of the hypothesis did not intend to carry the supposed condensation of the skin, cellular tissue, and fascia superficialis beyond the point at which the above detailed appearances are observed; but that measures were then designed to be taken in order to lessen or control the amount of irritation produced by the instrument, either by the substitution of a less severe block, or by placing next the skin some layers of silk or other tissue to prevent the direct action of the wood. Your Committee are therefore of opinion that it would not be quite consistent with impartial justice to include the *ulterior effects of the continued pressure of the blocks* in the investigation of the truth or falsity of the hypothesis. These ulterior effects will be mentioned hereafter; but the condition of the parts about the hernial orifice, or the abdominal canal, at the spot where the block presses, at the time when it is most deeply embedded, and during or after the highest irritation, is as follows:

The cutis vera, presenting one or the other form of redness above described, is sometimes thickened a little around the edges of the block, where a general puffiness of the integuments is occasionally observed. In some instances this thickening of the true skin is perceptible for a short distance beneath the more inclined, or inner and upper edge of Hood's inguinal block; but with all the instruments of this class which have been seen in use, the parts where the pressure is considerable, or, in other words, those which are nearest the hernial orifice *when the instrument is rightly applied*, are marked by no thickening of the skin; and, in some instances, that membrane is rendered obviously thinner than when in its normal condition, *even when the case has not advanced beyond the primary stage of irritation.*

The subcutaneous cellular tissue is found in every instance reduced in thickness by the obvious removal of the adeps, and by some process producing still greater compression. The Committee have seen no evidence whatever of the slightest thickening, either in the fascia superficialis, the abdominal tendons, or the edges of the external abdominal ring when that

part has been acted on: and in all the cases the skin, where most closely approximated to the fascia, can be made to glide freely over it, when moved by the finger.

After the final removal of the truss, the parts thus flattened or impressed by the block rapidly regain the general level of the abdomen. The cellular tissue receives anew its characteristic deposits, both within and beneath the cutis vera, and the adeps reappears. A few weeks are sufficient to effect this change; it is sometimes completed before the entire subsidence of the secondary redness, and it has been known to commence even under the pressure of the blocks of Dr. CHASE's trusses.

Your Committee feel compelled to regard these facts as conclusive against the truth of the doctrine, that the trusses or blocks of the first class produce a real condensation of, or adhesion between the skin, the subcutaneous cellular tissue, and the fascia superficialis or abdominal tendons.

If the depression were the result of a true condensation, it would be utterly impossible that the skin should retain, as it invariably does, its mobility upon the parts beneath. If adhesions actually took place, and the hypothesis which considers the cellular tissue as a membrane containing cells be true, the obliteration of those cells would render impossible the rapid reproduction of fat and the disappearance of the depression which has been described. If, on the contrary, that hypothesis be correct which represents the cellular tissue as a homogeneous mass, then the existence of adhesions between the cutis and the parts beneath could not permit the skin to rise again to its natural level until the accidental membranous connexions were gradually elongated by mechanical or other forces; but the parts interested in the present case are not subject to any mechanical distending forces, in proof of which the Committee will refer to the letter of the chairman already quoted; nor can it be supposed that interstitial deposition alone could occasion the necessary stretching of the adhesions within the time required; for this process is always slow and tedious, even under the action of very powerful forces, as is seen in the adhesions following inflammations of serous cavities. If any should believe it possible that the renewed interstitial deposits might elevate the skin to the natural level, the Committee would merely suggest that these depositions could occur only in the intervals of the factitious membranes formed by the adhesions, and hence, that the skin thus elevated, would be inevitably rugose—a character totally inconsistent with the facts of the case. Moreover, we often witness similar depressions of the integuments among the effects of long continued pressure by bandages and splints in surgical cases—as, for instance, over the tibia in ulcers of the inferior extremities—yet, in no case do we see the skin adherent to the parts beneath, unless in places where there has been an actual loss of substance or the establishment of the suppurative process.

Your Committee, therefore, entertain decidedly the opinion that the hypothesis of condensation and adhesion is untenable.

It may now be asked, if adhesion and condensation are not produced by the first class of trusses, what are their actual effects? It is plain that the inflammation produced by the blocks, is greatest around the margin, where the blood-vessels are left free to perform their functions; and, that nature, in that situation, attempts to arrest the progress of the inflammation, or to circumscribe it in the usual way. But the condensation produced by this attempt appears to be confined, like the inflammation itself, entirely to the



skin, and if the consequent irritation be extended to the subcutaneous cellular tissue in any instance, its effects are there confined to a slight increase of the secretions, apparently œdematous, and certainly fluid and temporary. These changes are confined to parts distant from the hernial orifice, and cannot have any influence, direct or indirect, in opposing the exit of the bowel.

Beneath the block, where the pressure has a direct relation to the orifice, the changes are all the result of simple absorption.

If the form of the blocks were well adapted to the anatomical form of the parts, this absorption, if not carried beyond a certain extent, would render the retention of the bowel more secure, by bringing the instrument into closer relation with the actual seat of the accident. The question how far the blocks of trusses of the first class are calculated to secure retention, will be discussed presently; but it is proper, in the first place, to notice the ulterior effects of the instruments when the pressure is continued after the degree of absorption already described has been effected.

In this class of instruments the pressure acts chiefly on the parts immediately beneath the most prominent points and the sub-angular shoulders of the blocks. In these situations the wood is soon brought to bear with great force, and over a narrow or small space, upon the abdominal tendons and fascia.

Your Committee, in their Preliminary Report, expressed their fears that in certain cases, the continuance of this pressure might endanger the integrity of the tendons themselves. They do not feel warranted in quoting hearsay evidence on the justice of this fear, but the Society will observe that in one instance under their observation this result has actually taken place, (see Case XII.) The patient is still under treatment; a long space running perpendicularly upward from a much dilated external ring, following the direction of the shoulder of the inguinal block of Hood and Stagner, as it was applied in that case, is greatly weakened by absorption. The abdominal tendons are there obviously thin toward the part pressed by the heel of the block, and are very obscurely felt toward the middle of the space. The upper outline of the external ring cannot be felt, and its external side seems shaded off gradually, and becomes indistinct at its margin. The bowel is perfectly retained by one of Dr. CHASE's large ventro-inguinal trusses, but the ability of the tendons to recover their original structure can only be determined by time.

The doctrine of adhesion and condensation being overthrown, there can remain but one mode of explaining the action of the instruments and their alleged claims as means of radical cure in hernia, viz: Their mechanical influence in producing perfect retention of the bowel; for, whatever changes may occur in the hernial orifice while the instruments are applied, even granting that these changes ultimately render their further application unnecessary, can only be due to the exercise of the natural functions of the part affected, and have no farther dependence on the instruments than such as results from their mechanical action in permanently removing the substances which were previously present from time to time in the false passages which constitute the disease.

We will now, therefore, proceed to examine the retentive power of the trusses of the first class, so far as the subject remained unfinished in the Preliminary Report.

The trusses with conoidal blocks may be safely dismissed with a very few words. If their points be placed accurately over the hernial orifice, whether the intestine makes its exit by the internal or external ring, or at any other point on the surface of the abdomen, these blocks must act as distending forces; and, when the absorption consequent upon their pressure has reached its maximum, they substitute the constant presence of an unyielding solid body lined by the integuments for the occasional presence of a soft and pliable viscus in the false passage—a state of things in which the remedy is literally “worse than the disease!”

Eberle’s or the Ratchet Truss, with a wooden or ivory block, is an instrument which has never attracted very general attention from the profession. The peculiar mode by which the block is attached to the spring is liable to very grave objections; but as these have been very fully discussed in the work of Dr. CHASE, the Committee deem it unnecessary to dilate upon them here. The block itself is tolerably well calculated for some forms of ventro-inguinal or direct hernia, but falls, in this respect, far behind some of the more recent improvements. For common inguinal hernia its mechanical construction is badly calculated, as it is very difficult to cause its longitudinal diameter to agree at all with that of the abdominal canal; and the enlargement of its lower extremity occasions its pressure to be chiefly exerted on the external ring, where it is least required. It is highly probable that the internal ring was seldom protected at all, in the majority of the cases in which it was employed, and could never have been *very securely guarded* in any instance. Yet, notwithstanding these disadvantages, it is said to have affected some radical cures of hernia, as indeed most trusses do occasionally. Your Committee have never seen it in actual use, but though it is obviously less dangerous to the integrity of the tendons than either of the other trusses of the first class, they cannot recommend any further trials of its value, as more recent contrivances are obviously safer, and more certain in their action.

Neither this truss, nor those with conoidal blocks, are applicable to femoral hernia, nor could the former be employed in umbilical hernia.

In taking up the consideration of the apparatus of Stagner and Hood, it should be premised, first, that Mr. Stagner’s specification contains no claim to originality, except in regard to the form of the block, and perhaps the hook, which replaces the button commonly used for fastening the strap of the truss; the instrument being precisely similar in all other respects to the common old inguinal truss: and, secondly, that Dr. Hood’s specification contains no claim to *any truss with a spring*, so far as your Committee are capable of comprehending the language of the document, which is not entirely divested of apparent ambiguity. His claims cover certain blocks invented by him, but he does not appear to claim the inguinal block, which the Committee, in their Preliminary Report, regarded as essentially the same with that of Stagner. He claims also a variety of compound and complex drawers, belts, &c. by means of which the blocks were to be applied without the aid of any main truss spring. But it was thought unnecessary at the time of the preliminary report, to go into the investigation of the action of these contrivances; and as they have been exhibited to the Society on a former occasion, the Committee will confine their remarks, at present, to the simple notification of their belief that these belts and drawers, viewed as means of retention in hernia, are vastly inferior to the simplest springs



of the old trusses, whatever may be the form of the pads or blocks employed. This opinion is given on broad mechanical principles, for the Committee have not deemed it necessary to subject it to any practical test.

The adaptation of the blocks of Dr. Hood to the springs of common trusses, is mentioned incidentally in his specification. It is directed that when the circumstances of the case permit, this adaptation should be made; and, as the Committee believe that all cases which admit of the application of the blocks, admit also of the application of the spring, their analysis will be confined to the action of the blocks as connected with springs, similar to those of ordinary trusses.

The umbilical blocks of Hood do not appear to differ essentially from those previously and occasionally employed by surgical practitioners, unless it be in the mode of attachment by means of a spiral spring; and the Committee have nothing to add to the remarks on these instruments made in the Preliminary Report. (Op. cit. p. 312.) They have little additional remark to offer upon the femoral block of the same inventor, except to point out the fact, that as the prominent line of the block must necessarily cross the cord of Poupart's ligament before its elevated point can reach even the spot at which the bowel, in this form of hernia, protrudes in front of the level of the fascia lata, it is impossible that the instrument can be brought into close relation with the hernial orifice beneath Gimbernat's ligament, except by the rupture or absorption of the ligament, or by a degree of compression intolerable to the patient; and that if the necessary relation could be established, the long plane presented by the block, so slightly inclined as it is to the rout of the intestine, could not exert any perfect retentive power without the aid of intolerable compressive force. It is but just to state that the instrument under notice shares this objection in some degree with all its predecessors in the treatment of femoral hernia; for they all press upon Poupart's ligament. None of them address themselves directly to the femoral ring. The objection indeed weighs more heavily against the block of Dr. Hood than against the soft pads of the old trusses; for the latter, by yielding to the pressure of the ligament, and expanding below it, do offer *some* valuable portion of upward pressure by acting on the soft parts beneath its margin; whereas the solid block, being altogether unyielding, exerts scarce a particle of such influence. Your committee deem no further reasoning necessary to account for their disapproval of this instrument.

The inguinal block claimed by Stagner, and adopted, and perhaps somewhat modified, by Dr. Hood, has been made the subject of comment in the Preliminary Report—where its advantages, and the valid objections against it, have been stated. Many cases who had employed this instrument have presented themselves to the Committee, and in a few only of these has the retention of the bowel been constant. They can recall but one instance in which the evidence of the friends, or that of the patient, tended to show that the bowel had never descended during the employment of the truss, after it had been sufficiently adjusted. (Case III.)

That occasional radical cures have been effected by the use of trusses armed with these blocks, is probable, for such results have sometimes followed the use of almost every truss; but, waving the pain and inconvenience produced by the block, which are often very considerable, the Committee have seen sufficient evidence that it furnishes but insecure means of retention, in any form of hernia, and that in the common inguinal

form, for which it is expressly recommended, it cannot be made to press sufficiently on the internal ring, while the lower point of the shoulder acts upon the external ring. From the details of Case XII., to which reference has been already made, the Society will judge how far the linear pressure of the elevated ridge of the block, and the small dimensions of the most prominent part, may endanger the integrity of the tendons and effect the enlargement of the external ring. The objections to the form of this block, appear to outweigh any advantages resulting from its solidity.

The ventro-inguinal block of Hood, was condemned with less hesitation in the Preliminary Report—but it is now proper to add the reasons for this condemnation. The block was intended, according to the specification of the inventor, to draw together the parts about the ring of a ventro-inguinal hernia, and to produce adhesion between those parts and the edges of the ring all around the orifice. It is unnecessary to repeat the reasoning which appears to us to prove the fallacy of this theory of adhesion, but the impossibility effecting the adhesion is the lightest objection to the instrument. A stronger one is found in the fact that the concavity of the block necessarily permits the bowels to protrude for a certain distance, so as to occupy the hernial orifice and prevent its contraction, should nature attempt to close it by that process.

The only block of the first class now remaining unnoticed, is the ventro-inguinal block, with a parabolic projection, termed by Dr. Hood "the scrotal block," which was approved, with justice, in Preliminary Report, (Op. cit. 323,) as it secured a more effective retention of certain cases of ventro-inguinal hernia than the armature of any truss then known; but the Committee considered "a more perfect instrument to fulfil the same purposes, both possible and desirable." The defects perceptible in this truss-block, appear to have been, in great degree, the result of the peculiar opinions of the inventor as to the *modus operandi* of his apparatus—the principal error consisting in the undue elevation of the inferior margin of the block, which was evidently designed to produce the degree of irritation held necessary to effect a cure. Another highly important defect was the strong curvature of the lower margin, which appears as though it were modelled upon the supposition that the external orifice of the abdominal is, as its name implies, *a ring*—and not as nature made it, nearly *a triangle*, with the two columns of the external oblique forming its lateral boundaries and the upper edge of the os pubis its base. The transverse fibres which truncate the superior acute angle of this triangle, do indeed present an arch upward in the normal condition of the parts, and the os pubis is somewhat curved downward between the columns, so that the orifice bears some resemblance to a ring when felt by the finger after reverting the skin of the scrotum; but in ventro-inguinal hernia, these transverse fibres are generally broken or absorbed, and the pubic base being much elongated by the separation of the columns presents but a very slight degree of curvature. The block under review is but ill adapted to the form of this part of the pubis, and hence it does not effect retention with sufficient certainty and constancy to give entire satisfaction.

The observations of the Committee upon these defects have given rise to the contrivance of a most beautiful instrument, the merits of which will be noticed in the sequel.

The specification of Dr. Hood's patent also contains some claims to a



certain mode of succession in the application of *different blocks in the same case, at different stages of the treatment*, and also, to the interposition of some layers of silk between the blocks and the integuments, and the removal of these layers from to time, *seriatim*;—as these measures relate only to the regulation of the degree of irritation produced by the apparatus, and as we have been compelled to oppose the doctrine which regards this irritation as desirable, we do not think it right to occupy the time of the society with any comments upon the subject of these claims.

From the result of all the evidence presented to them, and their reasonings upon it, the Committee are irresistibly drawn to the following conclusions. 1st. That the trusses of the first class do not secure the complete and permanent retention of the bowel with all the certainty which may be obtained by mechanical means. 2nd. That although it is extremely probable that radical cures may be occasionally effected by the use of such instruments, it has not been proved that the success following their employment exceeds that which has been obtained by the better kinds of trusses previously in use. 3d. That the action of these instruments is often attended with serious and unnecessary inconvenience, uneasiness and pain. Lastly, That their employment for too long a time, when the degree of pressure exerted by them is considerable, sometimes produces absorption of the tendons, dilatation of the hernial orifice, and an extension of the evils they are designed to remove; and that any attempt to obviate this danger, by lessening the pressure while the support of the instruments continues to be required, will diminish the security of the retention. For all which reasons the Committee do not feel warranted in making a favourable report on the claims of this class of trusses upon the confidence of the society.

In entering upon the analysis of the merits of the second class of trusses, the labour becomes more complex in character, and requires that the subject should be divided under more numerous captions.

As the course of the previous argument required that Eberle's or the Rachel Truss should be noticed in the former part of this Report, rather than in its natural order among its fellows of the second class, there remain for examination only the six instruments of Dr. CHASE.

The object of these instruments is to secure the perfect and permanent retention of the viscera in hernia, in order to permit the powers of nature to effect a radical cure after the removal of the misplaced parts which are supposed to offer the greatest obstacle to her success. It is proper, therefore, to investigate in the first instance how far they fulfil the all important purpose of retention; leaving their effects upon the tissues, the *modus operandi* of nature, in effecting the cure, and the extent of the results to be discussed in the sequel under distinct heads.

The inventions and improvements of Dr. CHASE, many of which have been adopted since the presentation of the Preliminary Report, extend to all parts of the truss and its appendages, and his attention to minute but highly important details has been carried to an extent never equalled by any of his predecessors in this branch of surgery. The complete instruments employed by him are—1st. The Inguinal or Common Inguinal Truss. 2nd. The Vento-Inguinal Truss. 3d. The Femoral Truss. 4th. The Umbilical Truss. 5th. The Umbilical Belt. 6th. The Double Truss. Each of these demands separate notice, and in most of them the following parts re-

quire distinct examination. (*a*) The Block; (*b*) the Block-attachment; (*c*) the Spring and Strap-attachment; (*d*) the Appendages.

### I.—OF INGUINAL OR COMMON INGUINAL TRUSS.

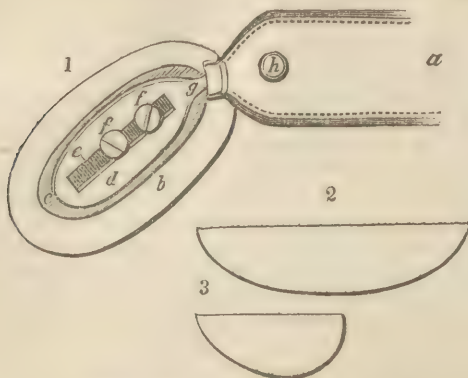


FIG. 1.—*a* The extremity of the main-spring of the truss.—*b* The block.—*c* The brass block-rider: the screws by which it is attached being covered by the block-slide.—*d* The block-slide.—*e* The window in the block-slide.—*ff* The two broad-headed screws of the block-adjustment, securing the rider to the slide, and, when loosened, sliding freely in the window.—*g* The soft iron flexible neck, attaching the block-slide to the main-spring.—*h* The button for the pelvic strap, which is generally used for the perineal strap also.

The proper perineal strap-button on the end of the block-slide is omitted in this and some succeeding figures, to prevent confusion.

FIG. 2.—Longitudinal section of the block.

FIG. 3.—Transverse section of the same.

(*a*) *Of the Block.*—The block of this truss was warmly approved in the Preliminary Report, (Op. cit. p. 323.) and it has amply maintained its character throughout the more recent investigations: it is so perfectly adapted to the form of the parts interested in common inguinal hernia that the Committee are unable to perceive in what manner it could be improved; nor has it ever failed, under their observation, in retaining the bowel both permanently and completely during the time of its employment, after the first few days required for the accurate adjustment of the instrument. Nothing farther appears necessary to prove the decided superiority of this block over all others known to the profession, in the particular form of hernia for which it is designed.

(*b*) *Of the Block-attachment.*—Two very important improvements upon the old modes of attaching the pad to the spring of the truss are observable in the block-attachment of the Inguinal Truss. The block is surmounted by a thin oval plate of brass, termed by the inventor a *block-rider*; and this is adapted to the under surface of an iron plate of nearly similar form, called the block-slide, to which it is attached by means of two round-headed screws, playing freely, when loosened a little, in a longitudinal fenestrum in the block-slide, so as to admit of any required change of the position of the block in this direction, to the extent of about an inch in the trusses designed for adults. The block-slide is connected to the spring by means of a round neck of soft iron, about three quarters of an inch in length, sufficiently stiff to resist any change of shape during the most active movements of



the patient, and sufficiently pliable to act like a universal joint under the hands of the surgeon. The combined action of the slide and the neck enables us to adjust the block with the utmost precision to the edge of Poupart's ligament, the rout of the abdominal canal, and the internal ring, whatever may be the peculiar form of the abdomen of the patient, while the block remains invariably in the exact position chosen by the surgeon; advantages possessed by none of the trusses previously in use, so far as they are known to the Committee. These improvements are, in themselves, sufficient to add very greatly to the value of the instrument.

(c) *Of the Spring and Strap-attachment.*—The endless varieties of form which have been given to the springs of trusses, render it apparently impossible that any thing intrinsically novel, in this part of the hernial apparatus, should be presented to the public hereafter; but it is of the utmost importance that the profession should determine what class of springs are calculated to give the greatest degree of security and permanency to the action of trusses.

This subject has been amply discussed in the work of Dr. CHASE already repeatedly cited; and the Committee are prepared, after due reflection, to coincide in the opinion expressed by that gentleman, that the semi-circular steel springs of Salmon and Ody are objectionable, because they are brought into accurate relation with the body only at the spots corresponding with the spine and the hernial orifice; the whole arch of the spring resting loosely over the side of the pelvis without a fixed location, and remaining liable to continual change of place from the movements of the glutei muscles and the reaction of the dress of the patient. The changes just mentioned must inevitably lead to the danger of corresponding changes in the position of the pads or blocks, and consequent insecurity of retention. The motives for the invention of this class of springs were the three following, and they are obviously fallacious. 1st. It was supposed that the pressure of the spiral elastic springs, being exerted throughout their whole length, renders them liable to derangement by the motions of the parts on which they press; but, excepting on the front of the hypogastric region of the abdomen, those parts have so slight a degree of mobility—based as they are upon the solid structure of the pelvis, and almost uninfluenced by muscular contractions—that their alterations of figure are of no real importance. The changes in the figure of the hypogastric region are fully compensated by the elasticity of the spiral springs, and those of the parts over the ring of the ilium are successfully counteracted by perineal straps, so that the accuracy and permanence of retention are not contravened when spiral springs are employed. 2nd. It was supposed that the changes of shape in the hypogastric region required some mode of adjustment more complete than that effected by the elasticity of the main spring, to enable the pad or block to accommodate itself at all times to the form of the parts; and hence the ball-and-socket pad attachment, to which the semi-circular spring was deemed peculiarly adapted. But, if desirable, this mode of attachment may be as readily employed in connexion with the spiral spring. Your Committee do not deem it desirable; because the ball-and-socket attachment renders secure but one point on the back of the pad or block, while the circumference may be tilted in any direction by the pressure of an intestine from within, almost as readily as by the movements of the abdomen, to which the pad is designed to yield; for the soft and compressible surface of the hypogastric region can-

not securely prevent this tilting when the adjustment of the pad is not remarkably accurate, or when the propulsive force of the intestine in hernia is considerable. A third argument urged in favour of the introduction of semi-circular springs was drawn from the tendency of the strap attached to the spiral spring trusses to draw upwards, and thus displace the pad; but this difficulty is completely removable by giving to the spiral spring and the accessory parts of the truss a proper form and disposition, as will be explained hereafter.

Your Committee are therefore of opinion that Dr. CHASE has done wisely in adopting the spiral spring, and retaining the strap so as to encircle the whole pelvis by the truss, in preference to the semi-circular spring and universal joint of Salmon and Ody's instrument, and the modifications of the same by the late Dr. HULL, of New York, the Rev. Mr. REID, of Georgia, &c. &c.

Although there is nothing positively novel in this part of the Inguinal Truss of CHASE, the inventor has established definite rules for the degree of temper and the extent of the various curvatures of the spring, and also for the position of the strap button, which render it easy to adjust the instrument more securely and permanently in all cases than can be done when these points are left to the discretion of instrument makers. Experience has decided that there is an advantage in giving an elastic temper to all that portion of the spring which intervenes between the pad-attachment in front and the opposite sacro-iliac symphysis in rear, but that the portion extending from the latter point to the opposite side of the pelvis should be so far softened as to admit of adjustment by being permanently bent. Three inches of the hinder extremity are left ductile in all the trusses of the full size; and thus the necessity of making an instrument expressly for each individual case (the great difficulty in the employment of spiral springs entirely of tempered steel) is completely obviated, without sacrificing the accuracy of the adjustment on the one hand, or its permanency on the other.

It has been customary to curve downward the anterior end of the spiral spring, so that when the part which lies across the back is horizontal, the front extremity may approach more nearly toward the abdominal canal. In CHASE's Inguinal Truss this curvature does not exceed three-fourths of an inch, and its commencement is found far back upon the costa illi when the instrument is applied; so that the spring, in passing forward from that point, winds downward below the anterior superior spinous process without encroaching too much upon the bellies of the glutii muscles or disturbing the proper position of the spring and strap on the back part of the pelvis. Any further increase of this curvature is attended with inconvenience, by giving the direction of the strap too much obliquity, and disposing the instrument to tilt upward in front; and such increase is rendered altogether unnecessary by the soft iron neck of the pad-attachment. In the last three inches of the anterior end of the spring there is another curvature, resulting from a slight torsion of the axis of the generating curve of the spring, which brings the flat side of this part of the spring into more complete correspondence with the surface of the hypogastric region—a matter of much importance to the comfort of the patient, and one giving additional security to the position of the instrument.

It has been customary, almost invariably, with truss makers, to place the



strap-button upon the plate or expansion which supports the pad, but Dr. CHASE has very wisely affixed it to the anterior end of the spring; by which means the obliquity of the strap is much diminished, and the pelvis is enclosed by the instrument in a direction approaching very nearly to the circle, the strap lying altogether above the level of the block-slide, and the disposition of the instrument to tilt or ride upwards being reduced almost to nothing.

The Committee consider the establishment of a fixed model for the triple curvature of the spiral spring, and the position of the strap button, as a highly important recommendation to the instrument under notice.

(d) *Of the Appendages.*—The perineal strap is never wanting in the Inguinal Truss of Dr. CHASE. It is attached behind by means of a sliding loop, through which pass the spring and cover. Before, it is commonly secured to the strap button, but each instrument is also provided with another button made expressly for the perineal strap. This is seated on the lower extremity of the block-slide, and may be used to give additional security and force to the action of the block when the lower part of the abdomen is very prominent and loaded with fat. The back-pad is a very important appendage to the truss, giving great certainty to the position of the instrument, by protecting from irritation the spinous processes of the sacrum, and filling the interval between the spring and the integuments along the median line on the back of the pelvis. Some very important improvements have been made in the construction and mode of attachment of this pad. It is formed of a simple circular disk of tin, about four inches in diameter, covered with soft buckskin, and lightly wadded. A broad sliding loop of leather suspends it on the spring and cover, so that its position may be adapted exactly to the size of the patient and other accidental circumstances. This perfectly free mobility of the back-pad is believed to be a novel arrangement and one of high practical importance; for it is found that the parts about the back of the pelvis are so intolerant of even slight pressure, when very long continued, that the subcutaneous fat becomes absorbed and the skin irritated by the mildest back-pad, if it be worn in one invariable position for many months consecutively. This difficulty is entirely obviated by an occasional change of position produced by sliding the pad a little toward one or the other side;—a change that is not attended with any loss in the security of retention, and which is accomplished more readily by the arrangement just described than by any other known to the Committee.

Having thus analysed the several parts of the Inguinal Truss of Dr. CHASE, the Committee feel bound honestly to state their conviction that this instrument surpasses all others known to them in the accuracy and permanence of its retentive power in common Inguinal Hernia; a conviction fully sustained by all their practical observations of the action of trusses. The instrument is worn with so much comfort, that patients generally relinquish it unwillingly, and sometimes *absolutely refuse so to do* even when pronounced well by the surgeon.

The Committee find themselves unable to suggest any improvement or to point out any defect of principle or construction in this truss as now employed by the inventor.

## II.—OF THE VENTRO-INGUINAL TRUSS.

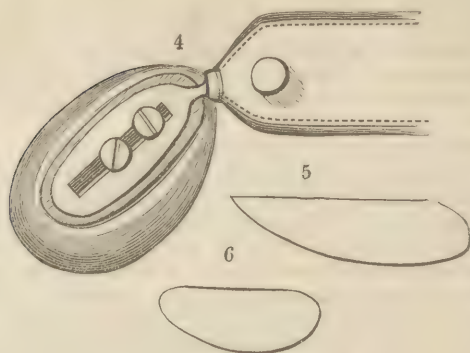


FIG. 4. The attachment being in all respects similar to that in fig. 1, no references are required.

FIG. 5. Longitudinal section of the block.—FIG. 6. Transverse section.

It will be recollected that at the time of the Preliminary Report, Dr. CHASE employed in ventro-inguinal hernia, either his own common inguinal block, or a modification of Hood's block with a parabolic projection. The former did not furnish sufficient security against protrusion, and we have already mentioned that the latter, though approved by the Committee as the best solid block then in use for inguinal hernia, is liable to some decided objections, not altogether unattended with danger. The Committee, therefore, stated that they considered "a more perfect instrument to fulfil the same purposes, both possible and desirable." (Prel. Rep. 323.) Their views on this subject having been freely communicated to Dr. CHASE, who was already conscious of the necessity of improvement in this instrument, he devoted his mechanical talent to the removal of the difficulty. The result was the construction of the ventro-inguinal block, described by the chairman under the head of *American Intelligence*, in the same number of the *American Journal* which contains the report, (p. 543.) At the time that the note was written, the Committee had not enjoyed an opportunity of testing the practical application of this block. They have since witnessed its operation in many cases, some of which were of a very unfavourable character. It is extremely difficult perfectly to retain a ventro-inguinal or direct hernia by any of the forms of soft pads, as it is indispensably necessary that those pads should press extensively upon the brim of the pelvis, in order that they may completely guard an orifice bounded on one side by the pubic bone. This pressure not only increases the number and severity of the cases of varicocele, a disease of frequent occurrence, under the use of all trusses, though seldom of much moment, but it also gives rise occasionally to troublesome hydrocele, and sometimes to wasting of the testicle. The form of CHASE's ventro-inguinal block is so accurately adapted to that of the os pubis, that it has secured the bowel perfectly in every instance of ventro-inguinal hernia in which it has been seen applied by the Committee. The primary adjustment of the truss is considerably more difficult, and requires more time and skill in the worst cases



of this accident than in the inguinal variety, but the ultimate success of retention does not appear to be less perfect when once accomplished. The pressure of this block upon the os pubis has been made a subject of complaint in only one instance, and the inconvenience then resulted from a slight mal-adjustment in the first application, which being corrected, the difficulty never recurred.

As regards the accidents consequent to the use of this instrument, the coexistence of varicocele has been observed in several instances, but the Committee think, not more frequently than after the use of the old common Inguinal Trusses. This affection, to the extent noticed, is so common in persons labouring under hernia, and even among those who are not effected with any other disease, that they feel considerable doubt whether in the cases observed, it was generally referable to the action of the truss, to the pressure of the intestines when protruded, or to some pre-existing cause. They have not been able, in more than one instance, to determine, positively, that it was caused by the instrument, and in no case has it produced material inconvenience. One case of slight and temporary hydrocele has been observed by the chairman, and in this the hydrocele attracted but little attention until after the patient had been ordered to relinquish the truss. It occasioned him some alarm at first, for he supposed that a relapse of hernia had taken place; but the symptoms disappeared in a few weeks. (Case V.)

An Agent for Dr. CHASE mentions another similar case, but it appears, from the slender amount of evidence heretofore obtained, that this form of hydrocele is of short duration, and of no material importance. In the very old and extensive ventro-ingual hernia described in Case I., there was an alteration of texture observable on the side corresponding with the hernia, both in the spermatic cord and the testicle, the latter being almost destroyed by absorption. The Chairman of the Committee, by whom these parts were most cautiously examined, is decidedly of the opinion that this change could not have been induced by the pressure of the wooden truss-blocks employed, defective as some of them were, because it is unreasonable to suppose that such results could have followed an embarrassment in the circulation of the cord, in the short space of time during which the hard blocks were in use, without occasioning pain or inconvenience to the patient. It is fair to conclude, then, that as the condition of the testicle had never been perceived by the patient until pointed out by the Committee, the absorption was the result of the long continued action of the ill supported intestines, together with the occasional pressure of ill applied trusses upon the pubic bone.

The Committee are, therefore, of opinion that there exist no physiological objections to the use of the Ventro-Inguinal Block of Dr. CHASE, which are not equally applicable to all known means of retention in ventro-ingual hernia; that this block is more accurately adapted to the form of the pelvis, and the parts on which it is intended to act, than any pad or block previously in use, and that it escapes the objections felt to the Ventro-Inguinal Block of Dr. Hood, by the greater regularity of its arched form, and the absence of any angularity or other peculiarity of shape designed for the production of irritation.

The only peculiarity of the Ventro-Inguinal Truss of Dr. CHASE, consists in the form of the block. In every other particular, it is identical with the

**Inguinal Truss.** But, in the application of the instrument, it is necessary that the perineal strap should be secured, at its anterior extremity, to the button on the end of the block-slide, and not to that on the anterior extremity of the spring.

To the complete instrument, as it has been actually employed during the last year, the Committee may safely apply the same language used in concluding their remarks on the Inguinal Truss.

### III.—OF THE FEMORAL TRUSS.

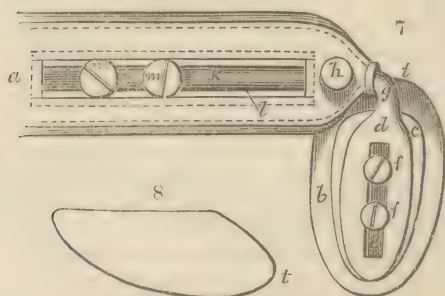


FIG. 7.—The letters from *a* to *h*, inclusive, have the same reference as in fig. 1.—*k* A window in the anterior extremity of the main-spring.—*l* The iron neck of the block-side, continued along the main-spring for some inches and seen through the window *k*.—*m m* Two broad-headed screws of the spring adjustment, securing the flattened extremity of the iron neck to the main-spring, and, when loose, permitting it to slide on the main-spring.

FIG. 8.—A longitudinal section of the femoral block.

The comparative rarity of femoral hernia, and the fact that a large proportion of the cases of this class occur in females, have prevented the committee from receiving testimony upon a sufficient number to form a safe basis for calculation in estimating the value of instruments by practical tests alone; and they feel under the necessity of treating this branch of their subject chiefly as a mechanical question.

Even the anatomy of femoral hernia has not been very well understood until recent times, and this furnishes the only reasonable excuse for the fact that, no truss expressly designed for the treatment of this variety of hernia has ever been strongly pressed upon the attention of the profession. Many trusses have been indeed advertised as applicable to all the forms of hernia;—a degree of pretension carrying with it the proofs of its own fallacy;—and certain works on surgery contain directions for slight modifications in the form of the pads, the curvature of the springs, and the mode of application of Inguinal Trusses, to adapt these instruments to cases of femoral hernia; but your Committee cannot recall any apparatus entitled to the name of a Femoral Truss, (the invention of Dr. Hood being not a truss, but simply a block intended to be added to the spring of one of the common trusses under certain circumstances) prior to the construction of the instrument of Dr. CHASE, which is now under examination.

It is proper to recall the attention of the Society to a peculiarity already pointed out as common to all the trusses previously in use, and to the femo-



ral block of Dr. Hood. The pad or block invariably covered not only the site of hernial tumour, but also a portion, and generally a considerable portion, of Poupart's ligament. That the pads or blocks which act in the manner above described cannot effect any great certainty of retention unless the ligaments be made to yield, and the neck of the hernial sac become pressed against the pubic bone with considerable firmness. In the opinion of your Committee, the degree of pressure required to accomplish this purpose would exceed the power of any truss-spring, and the capacity of endurance possessed by the patient, or that of the parts acted upon by the instrument.

All the instruments employed prior to the invention of Mr. Stagner are liable to another objection. They press upon so large a surface, that when employed in femoral hernia they are necessarily liable to displacement in the extensive motions of the thigh.

When the Committee view these remarks, in connexion with the fact that they have met with no detailed and satisfactory records of the radical cure of femoral hernia, by instruments, prior to the year 1835, they are strongly induced to conclude that, no truss employed before the invention of that of Dr. CHASE was capable of securing and maintaining that perfect retention of the last portion of the bowel beneath Poupart's ligament, which, by the hypothesis adopted in this Report, is indispensably necessary to the radical cure of this form of hernia.

It will be naturally asked, why, if the retention has always been imperfect or inconstant, have so many patients, labouring under femoral hernia, been secured for years against strangulation?

The reply does not appear difficult. The older trusses, with soft pads, when arranged with great care, were quite capable of closing all that part of the hernial sac which lay below Poupart's ligament; and if, during exertion, or unusual flexion of the thigh, a small portion of intestine was accidentally protruded into the sac, the pressure of the pad must have acted as the best of all modes of taxis, the moment that the exertion ceased or the position of the limb was changed. This action would tend to confine the protrusion almost constantly to the femoral canal, which, being very short and narrow, cannot accommodate a sufficient amount of intestine to produce much danger of strangulation, or to arrest the passage of alvine matter; yet the frequent presence of even minute portions of intestine in the canal, would effectually prevent the contraction of the orifice and destroy the hope of radical cure. The belief that trusses with soft pads do not actually retain femoral hernia, receives additional support from the symptoms of abdominal uneasiness, indigestion, chronic pains, &c. which are usually made a subject of complaint with those who are treated by such instruments both in this kind of hernia and in the inguinal varieties; symptoms which speedily disappear in the latter, when the retention is made accurate and constant by the instruments already described.

It appears, then, that Dr. CHASE in attempting the construction of a novel truss peculiarly adapted to the treatment of femoral hernia, ventured upon untrodden ground. We will examine the result.

(a) *Of the Femoral Block.*—At the time of the Preliminary Report, Dr. CHASE was in the habit of employing, for femoral hernia, a block in all respects similar, except in size, to that designed for common inguinal hernia. This was applied in such a manner as to act entirely below Poupart's ligament; and, when sunk by the absorption of the subcutaneous fat, &c. its

upper extremity tended to oppose directly, and therefore powerfully, the descent of the intestine beyond the margin of the ligament; but it was abandoned soon after the presentation of the report, when the doctrine of cure by irritation was shaken by the course of the investigations; and it was suggested that possibly a block could be invented, which, by becoming embedded in the integuments, might act by means of a suitable prominence beneath the edge of Poupart's ligament, and by pressing the soft parts directly upward, might arrest the bowel at the edge of Gimbernat's ligament, so as to render the retention as accurate as that obtained in inguinal hernia. This suggestion led to the invention of the femoral block mentioned in the note of the Chairman, already quoted. It is very difficult to describe the form of this block, and the Committee will refer to the treatise of the inventor for the best description and an excellent wood-cut representation of it. By considering the mechanical principles of its action, together with the only case fairly before the Committee in which it has been employed. (Case X.) it is deemed safe to recommend it as preferable to any pad or block previously employed in this variety of hernia. It is calculated to preserve its position more accurately than the one before in use; it is not liable to become disturbed by the motions of the thigh; and it gives support in a direction which enables it to act at the greatest mechanical advantage. How far it may answer the special purpose of its construction, by entering under the fold of Poupart's ligament and acting almost directly on the femoral ring, the Committee will not venture to judge upon the evidence of a single case. The report of Dr. CHASE as to its result in other instances, is favourable, but neither that gentleman nor the Committee regard it as having acquired the highest degree of perfection of which it is capable. It will, probably, undergo further modification.

(b) *Of the Block-attachment.*—The extreme accuracy desirable in the adjustment of the small femoral block, renders the mode of attachment a matter of great importance. Dr. CHASE has succeeded in reaching, in this respect, a degree of perfection much higher than that attained by any of his predecessors. The relation of the femoral ring to the parietes of the pelvis varies in different individuals to a much greater extent than that of the abdominal canal, and its variations are not so nearly confined to one right line. The soft iron neck of the block-attachment in this truss is bent at a right angle, so as to place the long diameter of the block in a position perpendicular when the patient stands erect. In this position the motions of the block-slide, which are similar to those observed in the preceding trusses, adapt the block to the height of Poupart's ligament with great nicety; but to meet the peculiarities of individuals in regard to the distance between the ring of the ilium and the femoral ring, another arrangement is necessary. There is a fenestrum, two inches in length, in the anterior extremity of the spring; and the soft iron neck, instead of being permanently secured to the spring, is elongated two or three inches, curved, flattened, and attached to the spring by means of two screws, which pass through the fenestrum, and, when loosened, play freely therein, so as to allow the block to approach or recede from the mesial line to any required degree. This double adjustment is simple, secure, and perfectly accurate.

There is no other peculiarity in the spring or appendages of this truss, but the perineal strap is always secured in front to the button on the bottom of the block-slide.



## IV.—OF THE DOUBLE TRUSS.



FIG. 9.—*a* Two common inguinal blocks with their attachments.—*b* The spring cover of the left truss terminating in the strap *c c c c*.—*c c c c* The pelvic strap of the left truss, thrown into loops, and passing through an opening beneath the base of the attachment of the strap on the right side at *e*, like the flexor tendons of the last phalanx of the fingers through the terminations of those of the second phalanx.—*d* The spring cover of the right truss terminating in the strap *f f f f*.—*e* The site of the commencement of the pelvic strap of the right truss, secured by the edges to the spring cover, but permitting the left pelvic strap to pass up from under its base so as to become superficial in the rest of its course; this arrangement being concealed by the instrument.—*f f f f* The pelvic strap of the right truss thrown into loops.—*g g g g* Loops confining each pelvic strap respectively to the spring cover of the opposite truss.—*h* The two springs seen one behind the other, and naked, between the ends of the spring covers.—*k k* Dotted lines representing the spots where the spring of each truss terminates within the spring cover of its fellow.—*i* A dotted line representing the proper position for the back pad.

Great difficulty has always been experienced in treating double hernia when the bowel protrudes on both sides of the lower boundary of the abdomen. The double trusses which have been from time to time constructed, have been formed by encircling the back and sides of the pelvis with a single spring armed with a truss-pad at each extremity; or the two halves of the spring, divided at the spine, were connected by means of a slide or hinge. Notwithstanding the many modes of adjusting the pads in the attempt to effect their accurate adaptation, it was found, practically, that the rigidity of these instruments rendered it impossible to secure the springs properly upon the pelvis or the pads upon the hernial orifice, and none of them have ever obtained the sanction of the profession. The imperfect action of the double trusses, drove the surgeon to the necessity of employing two single trusses in the treatment of double hernia; but here, again, the treatment is surrounded by difficulty; for the interference between the springs behind, and the twisting of the two straps round each other in front, render retention uncertain, and produce great annoyance and disgust to the patient, from the clumsiness of the machinery.

Since the Preliminary Report was read, Dr. CHASE has invented the admirable instrument now for the first time presented to the Society. It is an association of two single trusses, so combined as to be perfectly independent in their action, without the slightest mutual interference, yet so asso-

ciated by means of the straps and loose spring-covers, that they present the appearance and act with all the convenience of a single instrument. Each spring, at its posterior extremity, re-enters the spring-cover of its fellow, and the strap of one truss passes smoothly through a passage beneath the commencement of that of the other, so that both sides appear symmetrical, as far as the springs and appendages are concerned, and the straps do not in the slightest degree embarrass each other. As the peculiarities of this instrument are confined to the spring-covers and straps, which are suited alike to the trusses for inguinal, ventro-inguinal, and femoral hernia, the instrument can be adapted, at a moment's notice, to any possible combination of these three forms of the disease, so long as the varieties exist on opposite sides of the abdomen.

The Committee cannot speak too highly of this beautiful invention, but it may be safely permitted to speak for itself.

#### V.—OF THE UMBILICAL TRUSS.

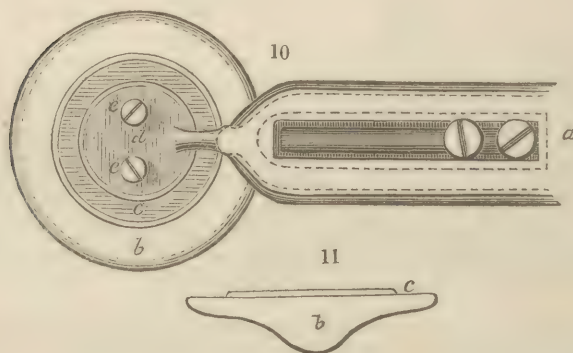


FIG. 10.—*a* The anterior end of the spring, with the same kind of spring attachment as in the femoral truss.—*b* The circular block.—*c* The circular block-rider.—*d* The circular iron disk supporting the block-rider.—*e e* Two button-headed screws attaching the rider to the disk, and serving at the same time to secure the strap.

FIG. 11.—Section of the circular block.

The peculiarity of the block in this instrument consists in its having a central prominence on the convex face, which prominence is a segment of a much smaller sphere than that which furnishes the margin of the block: it is thus made to correspond more nearly to the form of the parts about the umbilicus, while its effuse margin prevents the danger of too great absorption under its pressure.

The block with its brass rider is attached to a circular expansion on the anterior extremity of the soft iron neck, by means of two screws, one placed vertically about an inch above the other, and so formed as to serve at the same time as buttons, on which the strap is secured by means of a double series of eyelet holes. Of course, then, there is no mobility in this attachment. The only adjustment required is in a circular direction, and is accomplished by means of the following arrangement. The spring is placed horizontally. Its anterior extremity is provided with a fenestrum five



inches in length. The soft iron neck is about six inches long, and is secured to the spring by two screws which pass through the fenestrum, and may be made to slide therein precisely as those do which are seen in the corresponding part of the Femoral Truss.

The back-pad is made oblong instead of round, and is supported by two leather loops instead of one, as in the other trusses. It is arched transversely, and is about six inches long by four inches wide. This form is required to give support to the spring on the broad and flattened portion of the back.

This truss has secured the perfect and constant retention of the bowel in all the cases seen by the Committee, two of which were of a peculiarly unfavourable character. In Case XIX. the orifice by which the bowel protruded, extended for two and a half inches in the longitudinal direction, and one and a half in the transverse direction. The patient was enormously loaded with fat, and a block six inches in diameter was required to effect the retention.

In Case XXIV. the peculiar form of the sac and its enlarged tegumentary covering occasioned much embarrassment, as will be seen on reference, but it did not prevent success.

The only accident observed to result from the use of this instrument has been the slight excoriation or mucoid transformation of the skin where it is thrown into folds in consequence of the redundancy occasioned by the sac; an accident observable in bad cases only, one which is easily rendered tolerable by dusting the part with carbonate of zinc or other dry powders, and one, moreover, which is not dependant upon the character of the instrument employed. The Committee deem it, therefore, almost unnecessary to state their decided preference of this instrument.

#### VI.—OF THE UMBILICAL BELT.

The Committee will not detain the Society with any particular notice of this contrivance; but will merely state, in passing, that it is composed of a broad band of elastic caoutchouc tissue, armed with the block employed in the umbilical truss, and secured by means of a peculiar buckle. It possesses all the excellences of the best hernial belts, with better security against creasing than any of its predecessors. But your Committee deem all belts objectionable in the treatment of umbilical hernia, because it is impossible by such machines to effect the necessary pressure at the umbilicus without embarrassing the motions of the ribs and diaphragm in respiration; for the band acts equally at all points, exerting as much force in the lateral as in the antero-posterior direction. When the functions of the parts subjected to the action are taken into the calculation, it is evident that this arrangement is one exceedingly objectionable in a mechanical point of view. In the trusses, on the contrary, the elastic spring effects the necessary retention by its pressure on the back-pad and the block, which precisely counteract each other, and no more lateral pressure is required of the spring or strap than is requisite to protect the instrument from displacement by the friction of the clothes. In condemning the umbilical belt of Dr. CHASE, together with all its predecessors, the Committee feel much pleasure in stating that after practical tests which they did not deem necessary, it has been frankly relinquished by its inventor, although it has *effected radical cures in two cases.* (See Cases XX. and XXIX.)

One point of importance connected with the question of the retentive power of trusses is the constancy with which they are worn. The instruments of Dr. CHASE, regulated as the force of the springs now is, are worn day and night by the patients, and after the first week, very rarely continue to give any inconvenience. In order to enable patients to bathe and swim without danger of protrusion, this gentleman has constructed truss covers of India rubber cloth, *the varnished side turned toward the instrument*, which are designed to be used temporarily at watering places. They have been found to fulfil most perfectly the object of their construction.

As it regards the retentive power of the trusses which have been approved by the Committee, it has been tested in various manners, and severely. Some of the patients, while wearing them, have followed the most trying labours of the harvest field and the marble-yard; others have travelled hundreds of miles on horse-back, over mountainous countries. The subject of the worst incurable case of ventro-inguinal hernia,—which had destroyed his usefulness, notwithstanding his endeavours to retain the bowel by means of other instruments,—has since resumed his labours as a stevedor and sailor; some have followed the chase, and leaped fences and dykes, gun in hand, &c., &c.; yet, since the instruments were brought to their present high state of perfection, the Committee know of no instance of protrusion under these exertions. In one case only, the bowel has escaped after the final adjustment, in consequence of carelessness on the part of the friends of the patient, a young infant. (Case XXV.) And in another instance, the insanity of the patient lead to the removal of the truss. (See Prel. Rep. Note II.)

Your Committee deem any further comment on the retentive power of the trusses of the second class altogether unnecessary. These instruments certainly fulfil to admiration the two grand requisites which they consider necessary to bring the chances of radical cure in hernia to a maximum.

The extensive remarks already made on the effects on the tissues, produced by the first class of trusses, render it unnecessary to enter at length on those attending the use of the instruments just described; the institution of a fair comparison will be sufficient.

The irritation occasioned by the blocks of Dr. CHASE is much less severe than that observed when blocks of the first class are employed. That they are capable of producing much irritation, if such a result be desired, is obvious from the history of the case to which reference was made in the last paragraph; in which case inflammation was intentionally brought on, in order to test the powers of the instrument. More or less primary redness has been observed in nearly all the cases, though there have been some in which it could not be distinctly recognised. Except in the case just mentioned it has been always inconsiderable and evanescent, unless the patient had increased it by disobedience to orders. It has never shown that disposition to produce callosity around the margin of the block, which was noticed in some of the cases treated with other instruments. The absorption consequent on the long continued application of the block takes place more slowly, and seldom brings the skin into quite as close approximation to the tendons beneath. In very fat subjects, the block sometimes becomes deeply embedded, but their size and generally rounded form appear to prevent all danger of absorption of the tendons under the pressure. The secondary hyperemia,



resulting from the functional debility of the compressed capillaries, is noticed in every case, but in less degree than when other hard blocks are used, nor does it continue so long after the removal of the instrument. The Committee have never seen inflammation supervening after the subsidence of the primary irritation. It is remarkable that in many cases, the capillaries have partially recovered their tone under the pressure of the blocks, and the secondary hyperemia has been diminished after the trusses have been worn for a considerable time. The redness resulting from this cause is of course noticed in patients who resort to any species of truss, and the Committee, not being willing to trust to their memory of past experience unaided by notes, cannot institute a fair comparison in this respect between the effects of soft pads and the blocks of Dr. CHASE. Their impression is that the effects of the latter are more obvious than those of the former, but that the difference is of no practical importance. Attenuation of the skin has not been remarked in any patient employing Dr. CHASE's trusses in their present state of perfection.

Definitively; the Committee have been unable to trace any distinct connexion between the superficial effects of these instruments, and the changes perceived in the tendinous margins of the hernial orifices noticed during the time of their employment, changes which will next claim our attention.

The absorption of the subcutaneous fat, &c., following the use of these trusses as well as those of the first class, being unaccompanied with any thing like adhesion between the integuments and the tendons beneath, the thin skin of the scrotum is reverted beneath that of the inguinal region with great facility; and in hernia located there, the precise condition of the edges of the hernial orifices may be examined by the finger in the most satisfactory manner, and the following results have been obtained by the inspection of a large number of cases.

The orifices of very large ventro-inguinal hernia are found to contract rapidly after the perfect adjustment of the block, so that a few weeks or months will sometimes suffice to reduce an opening which will receive three fingers, with the skin of the abdomen inverted to less than one half its original area. (See cases I. and XI.) These extreme cases have generally been found in persons advanced in life; and, as the length of time which has elapsed since the very commencement of our investigations is less than three years, many of the cases presented to us are necessarily of recent date, and the question of radical cure remains, in them, still undetermined—if indeed it be reasonable to entertain a thought of such an occurrence under circumstances so extremely unfavourable. But this may be safely said:—The contraction continues upon the increase in all the cases yet incomplete, and no assignable limit short of the natural dimensions of the external ring have been ascertained! The instances referred to, will furnish the Society with a tolerable idea of the importance of the results in the few cases which have been under observation for twelve months or more.

While this contraction is taking place, the tendinous margin of the ring appears to increase very gradually in thickness, and the impression is produced that the substance of the tendon is enlarged by an intestinal deposition. This deposition is decidedly soft at first, but though rendered by degrees more firm and resisting, it does not distinctly assume the well marked characters of the purely fibrous expansion in which it is formed, within any

period yet determined, at least so far as can be ascertained by the sense of touch.

In common inguinal herniæ, even when they have become nearly direct, and in ventro-inguinal hernia of recent date, or moderate extent, the contraction and thickening continue on the increase until the affected ring is often rendered smaller, and, sometimes, much smaller than in the normal condition. (See Cases V. and XXIII.) The progress of the finger in the attempt to penetrate the external ring is then resisted with decidedly more firmness on the affected than on the uninjured side, and this is obviously the case in one instance in which there appears to have been congenital weakness of the parts on both sides. (Case III.)

In common inguinal hernia, the upper orifice at the internal ring is entirely beyond the reach of examination, and it is only by analogy that we can arrive at any inference with respect to its condition. The same remark holds good in relation to the condition of the orifice in femoral hernia.

It is unnecessary to point out the influence which the changes just described must exert in preventing the exit of the intestine. They will be understood by the Society without further comment.

The Committee do not feel called upon officially to express any theoretical opinions as to the mode in which nature accomplishes the contraction of the tendinous orifice in hernia when treated by means of the instruments now under notice, but it is their duty to state that they cannot trace the agency of any irritation produced by the truss-blocks in the history of these changes. The letter of the Chairman on the *modus operandi* of Dr. CHASE's apparatus, as published in the treatise of the latter gentleman, contains a full account of the opinions of one of the members on this subject, and the remainder of the Committee are not prepared to combat the positions therein maintained. If the theoretical views alluded to be correct, the singular fact of the contraction of the ring to a size still smaller than the natural one would be accounted for either by supposing that there remained a persistent callosity about the orifice, like that which sometimes continues long around the track of an obliterated fistula, or that the union of ruptured fibres formed an irregular tendinous mass, like the surplus amount of new bone which is produced by the reuniting of a fracture. It is not impossible that both these causes may contribute to produce the appearances described, and it becomes, therefore, a question of much interest to determine how long the undue firmness of the ring may continue; or, in other words, how far the deposition about the margin is provisional, and how far it is permanent. It would be certainly surprising, though by no means impossible, that the cure, when effected, should give the patient better protection than he enjoyed before the accident. This point can only be decided after several years of observation upon the same cases, and it is recommended to the attention of the Society.

The sac, when thin or small, generally escapes observation, and is probably obliterated or returned before the conclusion of the treatment; but when large and thickened, it is found continually contracting and approximating to the orifice by degrees. It is not always wanting when the tests of radical cure are applied without producing protrusion: while it remains, it is generally found more or less distended with fluid. In the letter of the Chairman, already referred to, there will be found a notice of a curious case



of umbilical hernia, in which the sac remained, and presented its connexion with the cavity of the abdomen long after protrusion had been rendered apparently impossible by the contraction of the orifice, under the use of a block of lead, moulded to the form of the part: one case of inguinal hernia occurring in the practice of Dr. CHASE, was attended with somewhat similar circumstances. (Case V.) These may be regarded as remarkable exceptions to general laws, but they are sufficient to establish two important positions; first, that a perfect occlusion of the neck of the sac is not indispensably necessary to the permanent retention of the bowels by natural means; and, secondly, that the changes in the tendinous margin of the orifice are not *invariably* productive of such occlusion. The latter of these positions furnishes a most powerful argument against the doctrine that the changes just mentioned result from the irritation produced by the truss-blocks.

After all that has been stated, the committee feel themselves fully warranted in the following conclusions.

1. The retentive power of solid blocks is, *ceteris paribus*, superior to that of soft pads in the treatment of hernia, as has been already stated in the Preliminary Report.

2. The chances of radical cure depend upon the perfection and permanence of the retention.

3. The perfection and permanence of the retention depend—first, upon the mechanical action of the instruments; and, secondly, upon the power of the parts affected to bear that action without danger of physiological accidents of sufficient importance to interfere with the treatment.

4. All the instruments with solid blocks contrived before the recent inventions of Dr. CHASE, are decidedly liable to important mechanical objections, and all of them, with the exception of the Rachet Truss, are moreover capable of producing physiological accidents of sufficient importance to interfere with the treatment.

5. The construction of the Rachet Truss is such as to render retention uncertain even in ventro-ingual hernia, to which form of the disease alone, it is tolerably well adapted.

6. The instruments of Dr. CHASE have effected the permanent and accurate retention of the intestines in every case of hernia observed by the Committee, without material inconvenience to the patient, and often under trials more severe than are usually ventured upon by those who wear other trusses; trials which would be imprudent with any other apparatus known to the Committee.

7. If we except the Femoral Truss, these instruments have stood the test of much practical application without superinducing any physiological accidents of sufficient importance to interfere with the treatment.

8. The mechanical principles upon which the femoral truss is constructed appear highly ingenious and promising, and unless this instrument should be found hereafter to be productive of important physiological accidents, it must take precedence of all other modes of treating this variety of the disease. No such accidents are yet known to have been produced by its employment; but the Committee have not enjoyed the opportunity of personal inspection in a sufficient number of cases to determine general results, nor do they deem it proper to receive evidence from any other quarter in discharging the trust reposed in them by the Society.

The Committee are induced by the foregoing conclusions to recommend, in strong terms, the instruments of Dr. CHASE to the confidence of the profession, as the best known means of mechanical retention in hernia, and as furnishing the highest chances of radical cure.

The Committee have not deemed it necessary to institute a *numerical comparison* between the degree of success attending the use of soft pads and hard blocks in the treatment of hernia; for the testimony of the highest surgical authorities, their own experience, and the general feeling of the profession, sufficiently prove the rarity of the cure of hernia by any of the apparatus in use previously to the commencement of the present investigation. They think they have done the most ample justice to the claims of the older trusses by the statements contained in the Preliminary Report, (p. 324,) statements which are less opposed to the claims of common trusses than are the opinions of Professor Hey of Leeds, Tavernier, Abernethy, Sir Astley Cooper, and many other European authorities of the highest class.

Before endeavouring to estimate the chances of radical cure by the use of Dr. CHASE's trusses, it is necessary to determine what is meant by a radical cure.

A variety of facts have been collected by Dr. CHASE which tend to show that vices of formation predisposing to hernia are sometimes hereditary in families, and that congenital weakness of one abdominal ring is not unfrequently accompanied by a similar condition of the other ring, and also of the umbilicus. In cases of the latter description, hernia is occasionally observed consecutively or consentaneously in each of these positions. Facts of this nature have probably given rise to the opinion expressed by some recent inventors of double trusses for the treatment of single hernia; namely, that the retention of a hernia on one side is like to produce a hernia on the other. The Committee see no foundation for this opinion, unless the strength of the spring of the truss be made much greater than necessary, or in cases of enormous hernia, in which the bowels have been allowed to remain protruded for so long a time that the abdominal muscles have become accustomed to an unusual degree of contraction.

Granting, however, for the sake of argument, that the liability to a consecutive hernia is increased by the retention of one already existing, the use of the double trusses in single hernia would still be objectionable, because the whole amount of pressure to which the abdomen is subjected by them is obviously at least twice as great as is necessary to effect retention, and hence the danger of consecutive umbilical hernia from the action of the instrument is at least doubled. It is obviously a task of extreme difficulty, if indeed it be not impossible, to guard against the occurrence of hernia at all its usual orifices, and the number of consecutive cases will probably be found to form a very small per centage on the whole number placed under treatment. The Committee, therefore, disapprove of the employment of trusses as a prophylactic measure.

Returning from this apparent digression, it does not seem proper to consider the consecutive occurrence of hernia in one situation as a disproof of the radical cure of a previous hernia in another situation.

As all men appear to be subject to this kind of accident under the action of certain forces, it would seem at first sight unreasonable to expect any course of treatment to effect a degree of security against the recurrence of the protrusion in any individual, greater than that which existed prior to



its first occurrence; and hence a cure may be fairly considered radical, without supposing the part affected relieved from the possibility of a reappearance of hernia at the same spot, under all possible circumstances and casualties.

The cases already mentioned in which the external ring has been contracted to a greater degree, and has been rendered firmer than natural during the course of treatment, tend to show that in certain instances the resistance to protrusion is greater after the cure than it was before the accident; and hence, that hernia from future injury would be more likely to occur elsewhere than at its first location. It is not unreasonable to suppose that this increased security may be sometimes permanent, but years of observation are necessary, as has been already stated, to determine how general the applicability of the rule may be.

In answer to the query, then—What is meant by a radical cure?—the Committee conceive the following reply the fairest and most rational that can be offered.

A cure is radical, when the tendinous and fascial barriers to the egress of the bowel are brought or restored to their normal or original firmness and power of resistance.

The only means by which such a result can be tested, are the firmness and resistance of the orifice when placed where it is subject to examination, and the absence of all appearance of protrusion after the truss has been relinquished for some weeks or months, and after the patient has pursued his usual avocations, resorting frequently to more severe exercises, such as coughing, leaping, fatiguing walks, swimming, lifting, dancing, riding on horseback, &c.

A variety of causes have tended to reduce the number of cases in which the whole history of the accident, the treatment and the result has been placed within reach of the Committee. Among the most important of these may be mentioned, the extreme unwillingness of many patients to relinquish the use of the truss, even when urged to do so by the united advice of their surgeon and the members of the Committee; the removal of many patients to a distance after having been a long while under treatment, but before it has been deemed perfectly safe to lay aside the instrument; and the unwillingness of some persons to submit to the necessary examinations;—yet, notwithstanding these difficulties, the amount of indubitable evidence actually furnished on the question of radical cure has been considerable, though none has been relied upon as a basis for conclusions, except such as has been furnished by the actual examinations of one or other of the members of the Committee, and the testimony of the patients themselves.

All the individuals who have relinquished the use of the trusses approved by the Committee, after having worn them for six months or more, and who have been afterwards examined by a member or members of the Committee, have been subjected to the necessary tests, and are believed to be radically cured in the sense of the foregoing definition. A still larger number who are yet under treatment give promise of a similar result, and those who refuse finally to relinquish the instrument on the advice of their surgeon, present, in the firmness of the rings, and in the absence of protrusion under exertions performed when the trusses are temporarily removed, very strong grounds for believing the cure to be radical in them also.

Two cases only of old ventro-inguinal hernia, occurring in persons of

nearly sixty years of age, and so large that the orifices admitted of the free passage of two or more fingers within the reverted skin, have been deemed incurable; but even in these, the contraction of the rings, and the resistance to protrusion when the trusses have been removed by the patients for a few hours, render the impossibility of cure by no means certain; and it is deemed improper ever to subject the patients to the tests necessary to determine the question. The enormous umbilical hernia which is the subject of note marked Case XIX., is in all probability incurable.

The cases observed include all the usual forms of external hernia, whether resulting from mechanical or physiological causes; and also, some instances of double and triple hernia. The complications which have not been presented are known to be very rare, and the Committee therefore feel no hesitation in expressing a strong and, they think, well grounded hope that a very large majority of the cases of this dreaded disease will yield to the action of the apparatus of Dr. CHASE, when under the direction of persons of high surgical and mechanical abilities.

It has become a subject of regret, since a number of points of unforeseen interest are found to be connected with the subject, that the Committee have preserved detailed notes of only a few of the cases, and have it not in their power to furnish numerical data for determining the frequency of the several forms of hernia, the relative curability, and the time required for the successful treatment at different ages, together with many other highly important subjects of inquiry. This deficiency is in part supplied by the treatise of Dr. CHASE; and it is understood that a statement of the results of the treatment in Ohio, from the pen of a gentleman of high professional reputation, will shortly appear in one of the western journals. Should these examples be followed in other places, the science will be undoubtedly enriched by many curious and important results.

In their Preliminary Report, the Committee expressed decided opposition to the employment of trusses in infants. Candour demands the avowal, that further observations has shaken their opinion on this subject. Several cases treated at a very early age, by the instruments under notice, have proved that they are borne without inconvenience in infancy. Some instances in proof of this will be found noted among the evidence in the Appendix to this Report. The adaptation of the trusses to the comfort of children under three years of age, and their superior certainty of action establish their claim to preference over any other mode of treatment. Their applicability, within the year, has been successfully tested in two cases; and it is certain that more force is required to confine the bowels by any form of bandage or compress, than by means of a well regulated spring and block. The only comparative trial of the soft pad and the hard block in an infant, (Case XXIX.,) has resulted in favour of the latter; but the Committee feel bound to urge the necessity of high surgical skill, and extremely careful attention in dealing with these little subjects.

The time required for the radical cure of an ordinary case of ventro-inguinal or direct hernia in the adult, appears to be from twelve to eighteen months. It is probable that the bowel, in common inguinal hernia, is rendered secure in a shorter time, but prudence has prevented the earlier relinquishment of the truss except in a very few cases. The orifice in umbilical hernia, appears to contract somewhat more slowly, but all the varieties recover much more rapidly in childhood.



The evidence, of which circumstantial details are preserved, will be found in an Appendix to this Report; and a case of high interest occurring in the practice of Dr. Henry Bond, of this city, is added to the list in consequence of its collateral connexion with the question before the Committee, although no remarks will be made upon it on the present occasion. It will probably form the subject of some comments on a future occasion, by the Chairman in his individual capacity.

The Committee will close their labours by recommending to the Society the appointment of a new Committee, to collect evidence on the several questions noticed as undecided in the present Report.

All which is respectfully submitted.

REYNELL COATES.

ISAAC PARRISH.

NOTE.

During the engrossment and final reading of the above Report and Cases, Dr. ASHMEAD, the third member of the Committee, was prevented from attending its meetings by indisposition and absence from the city, and his name does not appear among the signatures.

R. C.

## APPENDIX.

*CASE I.—Ventre-Inguinal Hernia, of 10 years standing, from sudden lifting; age of patient 58 years; imperfect retention from Chase's Ovoidal Block; contraction of the ring; Chase's Umbilical Block substituted for some days; failure of retention; new Ventre-Inguinal Block employed; perfect retention; bowels retained for hours under exercise without the instrument in twelve months; further tests of radical cure deemed imprudent; truss ordered to be worn permanently; alteration of cord and testicle.*

This case was drawn up to the 5th of December 1835, in the Preliminary Report. (Case I. p. 314.) The plano-convex block, then in use, failed in maintaining the hernia so well as the ovoidal block previously employed for five months. It was, therefore, removed, and the new ventro-inguinal block applied. The ring had contracted very considerably under the previous treatment, if the testimony of the patient himself be deemed conclusive, but it still received two fingers with facility, and the bowel had protruded occasionally, notwithstanding the presence of the instrument, up to the 24th of December, 1835, about which time the new ventro-inguinal block of Dr. CHASE was employed. The retention continued perfect from that time until the Committee lost sight of the patient in August, 1836.

*July 11th, 1836.*—The patient, examined by the chairman, states that he has had no return of colic since the new block was employed. The ring was found a little larger and less resisting than that on the opposite side, the edges somewhat thickened but softer than the original structure. Though ordered to wear his truss at all times, he repeatedly relinquished it during the month of June, and passed from his chamber to the yard, ascending and descending the stairs without it. Once, at night, when he had laid aside the instrument on retiring, he rose, and ran to a fire, at a considerable distance, not discovering the omission until his return. Not the slightest sign of protrusion took place during these exertions. The age and profession of this patient, coupled with the extent of the orifice, was thought a sufficient reason for avoiding any intentional tests of the radical cure of the hernia in this case, and the patient was enjoined to continue the use of the truss during life, notwithstanding the progress of the case had so far transcended any anticipation entertained by the Committee at the time of the Preliminary Report.

The patient was seen by members of the Committee several times after the 11th of July. This truss gave no inconvenience, and he stated that he was generally unconscious of its presence. He had renewed his labours as a ship watchman, and frequently assisted in unloading vessels.



*Jan. 12th, 1837.* This patient has gone to sea as a sailor, and the Committee have lost sight of him.

There were some circumstances of peculiar interest in this case. On the 11th of July, 1836, the spermatic cord on the affected side was found enlarged to at least three times its natural size. It was soft, and did not feel as if the veins were varicose. The corresponding testicle was much reduced in size and felt like a mass of oedematous cellular tissue enclosed in a firmer, but ill-defined cyst. The sac still continued very thick but had contracted to about one third of its former dimensions. The parts were critically examined by Drs. HORNER and HAYS, and by the Chairman of the Committee. Some doubt existed as to the complete adhesion of the neck of the sac; one of the gentlemen mentioned being convinced of its occlusion; another being of opinion that it remained pervious, and the third declining to decide the question.

Dr. R. COATES was inclined to attribute the enlargement of the cord to an interstitial deposit of the consistence of jelly, and the alteration of the testicle to absorption from an embarrassment of circulation for many years, occasioned by the continued pressure of the protruded intestines and ill-adapted trusses.

*CASE II.—Common Inguinal Hernia, from a fall; seven years standing; age of patient 13 years. Radical cure in six months, under the use of Chase's Common Inguinal Truss.*

This case is narrated to Dec. 5th, 1835, in the Preliminary Report, (Case II. p. 315.)

*April 2nd, 1836.* Examined by the Chairman. The external rings on both sides offer the same resistance to the finger, and appear to resemble each other exactly. The patient feels no sensation of weakness or other symptom of the existence of hernia. He has seldom had recourse to his truss since the 5th of Dec. 1835; having only employed it when resorting to unusual exertions. Pronounced cured and ordered to lay aside the instrument entirely. The depression of the integuments beneath the block has entirely disappeared, as has also the redness.

*Jan. 11th, 1837.* The lad continues perfectly well. Has not worn his truss since the last date. He is radically cured.

*CASE III.—Common Inguinal Hernia; four months standing; age of the patient about 30 years; congenital enlargement of the lower part of the abdomen; both external abdominal rings preternaturally large and weak; ring on the affected side rendered smaller and firmer by the treatment. Radical cure in thirteen months.*

This case is drawn up to Oct. 24th, 1835, in the Preliminary Report, (Case III. p. 315.)

*Feb. 1837. (Day of the month not noted.)* The patient omitted the application of the truss, occasionally, from May to July, 1835, and even worked in the harvest field without it. In July he was advised to relinquish it entirely, being pronounced cured. He has not steadily complied with this wish. The external ring on the side affected is now decidedly smaller and more resisting than that on the other side. Its edges are thickened. Ample testing, by vigorous exercise without the truss has been resorted to. The patient was strongly pressed to relinquish the truss entirely, by the

Chairman of the Committee. He is believed to be radically cured, but liable to hernia on the opposite side of the abdomen from slighter causes than usual, owing to the original structure of the abdomen.

CASE IV.—*Common Inguinal Hernia, from Pertussis; accident of seven years standing; age of patient 9 years; treated by Stagner's or Hood's block for some months, then by Chase's Inguinal Truss; retention by the latter perfect after three days. Radical cure.*

March 29th, 1837. This case is detailed to Dec. 5th, in the Preliminary Report, (Case IV. p. 316.) The patient has been repeatedly before members of the Committee, since the last date, but nothing peculiarly worthy of comment has been observed except what is contained in the following note of his father, which communicates the result. He is believed to be radically cured.

*Philadelphia, January 14th, 1837.*

GENTLEMEN:

I wish to inform you that my son I believe to be quite well of his rupture. He is now gone to — to a boarding-school, and before he left, I examined him carefully, as I have been in the habit of doing while he was under the care of Dr. CHASE. His bowel has never been down, to the best of my knowledge, since the first application of the instrument. He has never complained of pain in the part. He did not take his truss with him, as I did not think it necessary. I do not know the time that he laid aside the truss, but I think it might be in April last.

H— C—.

DRS. COATES, PARRISH and ASHMEAD.

CASE V.—*Common Inguinal Hernia, of one month's standing, from running violently; age of patient about 35 years. Radical cure in five months.*

This case is detailed up to Dec. 5th, 1835, in the Preliminary Report. (Case V. p. 317.)

Feb. 1837. (*Day of the month not noted.*) This patient states that soon after the last note of the Committee, he was alarmed by the appearance of what he mistook for the return of hernia, but on applying to Dr. CHASE, he was convinced of his mistake. The latter gentleman in his treatise already quoted mentions that sometime after the 5th of Dec. 1835, he consulted him several times under this impression.—(p. 148.) He is decidedly a hypochondriac. At his own instance, the truss was reapplied, though deemed unnecessary. Sometime afterwards, his surgeon represents, that he had an accumulation of serum in the sac; a circumstance which, as Dr. CHASE justly remarks, is not uncommon during the treatment of hernia, even when accurately retained, and which need not occasion alarm. This serum retired into the abdomen on pressure, proving that the neck of the sac was not, at that time, obliterated.

No signs of the sac are now traceable, and no remains of the effusion have been visible for a long time. There appears no reason to believe that the latter had an abdominal origin.

The patient occasionally relinquishes the truss for a time, but labours under nervous timidity with regard to a relapse. The Chairman of the Committee, by whom the last examination was made, strongly urged the



entire abandonment of the instrument, on the plea that the unnatural and unnecessary support might eventually produce weakness by removing the necessity of the functional exercise of the part; but it is not probable that the patient will permanently adhere to the advice, as the truss gives him no inconvenience. He is believed to be radically cured.

The apparent anomaly of the preternatural diminution and firmness of the ring, noticed in the Preliminary Report, which could not be explained at that time, has been proved to fall within the range of a general law, by the subsequent observations of the Committee. It is now still more remarkable than when first noticed.

*CASE VI.—Common Inguinal Hernia, of many years standing; age of the patient supposed to be about 35 years; cause unknown; imperfect retention by the best English Trusses; also by Stagner's or Hood's block; perfect retention by Chase's Inguinal Truss.*

The Committee lost sight of this case soon after the last date in the Preliminary Report. (p. 317.) The tests of the retentive power of the instrument were violent, but the question of radical cure could not be solved, as the gentleman left Philadelphia while under treatment. Dr. CHASE states that when last seen by him, in March, 1836, the patient was not wearing the truss and had not experienced any protrusion.

*CASE VII.—Ventre-Inguinal Hernia, of several years standing; age of patient 33 years; relief, and prospect of cure from Chase's Common Inguinal Truss.*

This patient is the subject of the seventh case of the Preliminary Report. He has disappeared, and the Committee know nothing of his history after January 24th, 1836. His condition then gave promise of cure. The case has not been seen since the invention of the Ventre-Inguinal Truss.

*CASE VIII. of the Preliminary Report; Femoral Hernia.*

This patient is said to have had no return of the protrusion, but she is represented as still using the truss. The Committee have had no opportunity of examining this case at any time, and are not acquainted with its history since November 30th, 1835.

*CASE IX. of the Preliminary Report; Congenital Hernia.*

This case has not been heard from since December 4th, 1835.

*CASE X.—Femoral Hernia, of two years duration; age of patient 30 years; Hood's Femoral Block not permanently tolerated; other trusses producing imperfect retention; apparently perfect retention by Chase's Femoral Truss, with the Ovoidal Block; perfect retention by the new Femoral Truss; radical cure.*

This patient is the subject of a note by Dr. Ashmead in the Preliminary Report, q. v. (Case X., p. 319.)

*March 29th, 1837.*—The truss has been occasionally worn, in this case, up to the present time, but only for a few hours at a time, during unusual exertions. The new femoral block of CHASE was substituted for the ovoidal block soon after the invention of the former. This occasional use has prevented the return of the subcutaneous depositions, and the patient states

that the block "embeds itself so that the shoulder, or projection, dips underneath a sharp edge of something which I suppose is Poupart's ligament, and, whenever it is applied, rises up under it." This is his own phrase. The depressed skin now plays freely over the parts beneath, so that no adhesion exists between the integuments and the hernial orifice. The Committee have enjoyed no recent opportunity of witnessing the position of the truss. Neither the old nor the new Femoral Trusses have given any material inconvenience.

The patient assures us that the action of Hood's Femoral Block, which had been previously employed, though when in its intended position it apparently retained the hernia, "could not be borne for any length of time, and that, as soon as it was moved, the bowel descended." It produced great inflammation, and a sore over Poupart's ligament, which confined him for two weeks to his bed. The orifice in this case must have been large when the treatment by wooden blocks commenced, as the bowel then slipped down and was returned by the fingers with the utmost facility. The descent always took place on walking across the floor of a room.

Since the time of the Preliminary Report, he has tested the cure by pursuing his usual avocations, swimming and other severe exercises, for weeks together, without any application of the truss. His occasional use of the instrument is made entirely at his own suggestion. He is considered radically cured; but, whether the result has been obtained solely by the old, or partly by the new Femoral Truss of Dr. CHASE, the Committee will not attempt to determine. Reference to the Preliminary Report will show that the cure was far advanced while the ovoidal block was in use.

The Committee place much confidence in the representations of the patient himself in this case, as he is a gentleman of education and intelligence.

*CASE XI.—Large Vento-Inguinal Hernia, of many years standing; producing ill health and disability; age of patient 60 years; complete relief and perfect retention by Chase's Vento-Inguinal Truss.*

This is the case marked Note I., in the Preliminary Report. The estimable and companionable old gentleman who is the subject of it, has been seen several times by the Committee during the year 1836. He has been restored from a condition which rendered life almost a burden, to one of high comfort and enjoyment. The Preliminary Report displays the effect of the ovoidal block in securing *the permanent*, but probably *not the accurate*, retention of the bowel, for he could only venture upon very moderate exercise with safety, and continued liable to much abdominal uneasiness at times, until the ventro-ingual block was brought to perfection, and substituted for the previously applied and worse adapted one. Since that time he has been restored to perfect health, walks long distances without suffering, has passed a season in his favourite amusement of trout fishing among the mountains, and wears his truss with scarce a perception of its presence. During occasional relinquishment of the instrument, which has now and then continued for some hours, no signs of protrusion have occurred. No accurate examination of the ring has been made for a long time. It is deemed altogether improper to test, in this case, the natural powers of retention, and the instrument will be worn during life.



CASE XII.—*Common Inguinal Hernia; Stagner's or Hood's Block employed; deep linear depression of the integuments; absorption of a portion of the tendon of the external oblique muscle; perfect retention by Chase's Vento-inguinal Truss; improved condition of tendon; case still pending.*

The commencement of the history of this case will be found in Note IV. of the Preliminary Report, (p. 321,) and was written in December, 1835.

March 5th, 1837. The patient was examined by the Chairman of the Committee this day. Dr. CHASE states that the patient continued to wear the truss with Stagner's or Hood's Inguinal Block, for three or four weeks after the examination in October, 1835, in consequence of neglecting to call on his surgeon agreeably to appointment. This unfortunately led to a more rapid alteration of the part of the tendon pressed upon than was calculated on, either by the Committee or his surgeon. The new Vento-inguinal Truss was applied as soon as completed. The present condition of the parts about the orifice is as follows.

The integuments are still considerably depressed in consequence of the subcutaneous absorption, but the block applies itself equally over a wide space, without bearing too forcibly on the tendons. The retention has been perfect from the first. The skin is not rendered preternaturally thin. It is slightly red from the debility of the capillaries produced by pressure, but there are no signs of irritation about the part. The skin slides over the parts beneath with the greatest facility, proving the absence of adhesions.

The usual resistance to the finger offered by the abdominal parietes is wanting over a space of about two fingers breadth, running perpendicularly upward from the edge of the os pubis at the site of the external abdominal ring. The existence of the tendon of the external oblique muscle is obscure throughout this space, and is not perceptible at all toward the lower part of the space. On reverting the skin of the scrotum before the finger, into the external ring, the internal column is found well defined; the external column is indistinct. The tendon can be felt in a healthy condition far to the right, but appears gradually reduced to mere cellular membrane as it approximates to the ring, the upper margin of which cannot be determined by the sense of touch. The spermatic cord is felt throughout nearly the whole length of the abdominal canal, with such extreme distinctness that it might be supposed to be covered only by a thin layer of free cellular membrane. Dr. CHASE thinks that the absorption of the tendon was considerably more extensive than at present, at the time of the removal of the instrument formerly in use, and that the restitution of the natural structure is now making slow progress. On this point the Committee have no knowledge from personal observation.

CASE XIII.—*See Note V. of the Preliminary Report, (p. 321.)*

This case has not been again presented to the Committee. The patient was thought to be radically cured when the note, to which reference has been made, was written.

The foregoing details complete the history of all that is important in relation to the cases which were made the subject of comment in the Preliminary Report. The patient mentioned in Note II. (p. 320,) of that paper, has been much deranged, and his insanity has interfered with the treat-

ment. He is no longer under the observation of the Committee. The cases described in Note III. (p. 320,) and Note VI. (p. 321,) have not been heard from since those notes were written.

CASE XIV.—*Common Inguinal Hernia, of about one year's standing; age of patient 27 years; radical cure in seven months.*

This patient, a female, was ruptured on the right side, during unusual exertion while preparing for a voyage from Ireland to this country in 1834. No surgical advice was taken until October, 1835, when she was directed to the care of Dr. CHASE by Dr. ISAAC PARRISH.

The details of the case will be found at length in "Chase on the Radical Cure of Hernia," p. 162.

*April 19th, 1836.* Patient examined this day by the Chairman. The Inguinal Truss of Dr. CHASE was applied on the 20th of April, 1835. The woman states that she suffered some pain, but not a great deal, from the action of the first truss. Another, with a block and spring more suitable to the formation of the individual's pelvis, was substituted on the 31st. The irritation then subsided, and the truss produced no more complaint. The retention was complete, from the first application on the 20th of October. The woman being far advanced in pregnancy, the truss was laid aside on the fourth of last month. No protrusion has taken place. She has a very large abscess of the left breast, which was opened by the lancet this morning.

*May 16th.* Seen by Drs. CHASE and R. COATES. Patient was delivered with rapidity on the 4th instant, and suffered severely with after-pains. It is thought that this test of the security of the retentive power of the abdominal tendons and fascia is sufficient to warrant complete reliance upon it, and the patient is directed not to resume her truss on leaving her chamber.

*July 11th.* Again visited by the Chairman. She is pursuing her usual avocations, and is pronounced radically cured.

*March 30th, 1837.* This patient continues perfectly well. On reviewing the notes, the Committee think it right to mention that the absence of protrusion during the last months of pregnancy, and even during labour, is a fortunate and not unfrequent result of the position of the gravid uterus, which displaces the intestines from their usual position. It was therefore the absence of protrusion during continued and severe after-pains which alone induced the conclusion that the cure might then be safely considered radical. These remarks are intended as a caution to the inexperienced, who might naturally conclude that the absence of all symptoms of hernia in the inguinal or femoral region, during the latter months of gestation and the period of labour, was a sufficient proof of the non-existence of the disease. In umbilical hernia, continued retention during the latter moments of labour would indeed be a strong argument in favour of the radical cure.

CASE XV.—*Common Inguinal Hernia, of seven years standing; age of patient 12 years; radical cure in seven months.*

*Dec. 4th, 1835.* CHASE's Inguinal Truss was applied on the 27th of November last. Some redness from irritation is visible when the truss is removed, but no inconvenience is felt from it. The retention has been constant and perfect from the first.

*April 1st.* There has been no protrusion. No difference between the size and resistance of the two rings can be distinguished on reverting the skin



of the scrotum before the finger. Some redness continues, but the patient insists that he is seldom aware of the presence of the instrument. There has been much less subcutaneous absorption than usual in this case.

*June 22nd.* Examined by the Chairman. The patient has often removed his truss for some hours at a time; he has taken walks, and has gone on swimming excursions repeatedly without it.

The opposite sides of the abdomen now appear perfectly similar in all respects. The redness and depression beneath the block have both disappeared. The case is believed by the Chairman to be radically cured, and he strongly advises the discontinuance of the truss.

*March 31st, 1837.* This little patient has been repeatedly seen by members of the Committee since the last date, and was critically examined by the Chairman in February. He wore the truss occasionally for some weeks after the 22nd of July, 1836. He is now perfectly well, vigorous and active.

CASE XVI.—*Ventro-inguinal Hernia, of six years standing; age of patient 10 years; cure radical.*

*Feb. 26th, 1837.* This case is fully detailed in Dr. CHASE's Treatise, (p. 166, Case XX. q. v.) but has only been seen by the Chairman of the Committee on the present occasion. The Ventro-inguinal Truss was applied December 13th, 1835. The patient testifies that there have been no signs of protrusion at any time since that day. Dr. CHASE considered the patient radically cured June 20th, 1836, six months after the commencement of the treatment, as prior to that time, by the patient's own showing, he had repeatedly left off the instrument during bathing excursions; but the boy's father compelled him to continue the use of the truss. He has more recently laid it aside on many occasions for several days together; has cast it off entirely for the last two weeks, and has been enjoying himself in skating on three different days without any protrusion whatever. The external ring is about the natural size, and there remain no marks of a truss ever having been used in the case, except in the persistence of a slight subcutaneous puffiness in the parts beneath the block. The patient is now radically cured, whatever may have been his condition on the 20th of June, 1836.

CASE XVII.—*Direct Inguinal Hernia, from coughing in an attack of asthma; case of four years standing; age of patient 45 years; radical cure of the hernia; persistence of the asthma.*

The details of this case will be found at length in "CHASE on Hernia," p. 167. The patient was first seen by the Chairman of the Committee, July 10th, 1836. He then stated that he had laboured under hernia for nearly five years. The orifice is stated to have been large and direct. It originally admitted two fingers. The old common truss had been employed, but the bowel frequently descended beneath the pad. Dr. CHASE first saw him October 28th, 1835. Hood's Parabolic Block, with CHASE's Truss-spring, was applied. The retention was perfect till the 30th of October, when an attack of asthma occasioned a protrusion. A truss with a firmer spring was employed, and the retention continued constant during the whole course of the treatment. After the introduction of CHASE's new Ventro-inguinal Truss, it was applied in this case, but the Committee possess no note of the date of this substitution.

*July 11th, 1836.* Examined by the Chairman. The truss now in use

(CHASE's Vento-inguinal) has never given any inconvenience—all those previously employed had done so. The patient performs all his duties as a master stone-mason with composure and ease—a former fracture of the patella leading him to avoid very heavy lifting, by the advice of Dr. HARTSHORNE. In the early part of last month he left off his truss for ten days, and pursued his business without any accident; for which he was censured, and directed to continue the application of the instrument. The edges of the ring are now well marked and somewhat thickened, but are very little less contracted than on the sound side.

*April 1st, 1837.* Some two months ago this patient was seen by the Chairman. He continued to wear his truss occasionally when performing heavy lifting, and during attacks of asthma. Since that time he has been lost sight of by the Committee. No signs of protrusion have ever appeared during the considerable periods for which the truss has been relinquished, although no particular care has been used to avoid exertion in the pursuit of his usual avocations in the marble yard.

*CASE XVIII.—Inguinal Hernia, of four weeks standing, caused by an accident in riding on horse-back; age of patient 30 years; radical cure in seven months.*

The details of this case will be found in CHASE on Hernia—(Case XXIV. p. 171.) The bowel burst into the abdominal canal, near the middle of its track, not having passed through the internal ring at all. The internal orifice did not correspond with the external ring, but remained concealed beneath the tendon of the external oblique muscle. The Inguinal Truss was applied by Dr. CHASE, December 4th, 1835, and it was ordered to be laid aside July 17th, 1836. After the adjustment of the instrument, which required some more care than necessary in common inguinal hernia, it was worn day and night for about four months, and in the day time only for nearly three months longer.

*Jan. 1st, 1837.* Examined by the Committee. The patient states that he has never suffered a protrusion, from about the 10th of December, 1835, (one week after the first application of the truss,) to the present moment. He wore the instrument occasionally from the time he was ordered to relinquish it until about the 1st of December last, since which he has not applied it at all. The ring is now quite as firm and small, if not more so, than that on the opposite side. The parts formerly pressed upon by the truss, display not the slightest traces of its presence. Much adeps covers the lower part of the abdomen. This patient is considered radically cured.

*CASE XIX.—Umbilical Hernia, of many years standing; enormous orifice; complete retention by Chase's Umbilical Truss, with a block six inches in diameter; patient restored to usefulness, but deemed incurable.*

The details of this most interesting and still pending case, will be found drawn up to the 25th of July, 1836, in CHASE on Hernia, p. 174, (Case XXVIII.) The orifice, as measured by the Chairman, May 30th, 1836, was two inches and a half long by one and a half wide, running along the linea alba above and below the umbilicus; the sac, with the integuments covering it, was very large, and flabby after reduction. Dr. COATES thought that caution would be required in applying the truss, lest the whole mass should be reverted bodily within the abdomen! The patient was excessively fat.

A truss with a block six inches in diameter, was applied for some months, one of seven inches diameter was afterwards found preferable. The overlapping of the loose sac, which formed a soft cushion beneath the block, gave rise to excoriation and mucoid transformation of the skin, which was relieved by dusting with the impure carbonate of zinc. On the 17th of July, the orifice was contracted to at most half its former dimensions, and the sac had become diminished at least one-fourth.

*April 29th, 1837.* The patient was examined, and the truss removed by the Chairman this day. The sac, loose, flabby, and perfectly empty, even of serum, but not obliterated by adhesion, still remains, but is much diminished in size. There is no irritation of the surface, the parts being perfectly accustomed to the pressure of the instrument. The enormous obesity of the patient makes an accurate examination of the linea alba exceedingly difficult, but no signs of the hernial orifice could be ascertained by the finger. The truss was reapplied. The patient is perfectly comfortable, and attends to laborious duties with impunity.

*CASE XX.—Umbilical Hernia, of 21 months standing; age of patient two years; radical cure in five months by Chase's Umbilical Band.*

Of this case the Committee have no knowledge other than that derived from the mother and the surgeon, until after the completion of the cure. Attempts to relieve this patient (a female) by pressure with the hand when it cried or used exertion, were made without effect; but it is not certain that they were very faithfully made. The orifice is described to have been large enough to admit the end of the thumb with facility. The band was applied February 15th, 1836. Retention was constant and perfect, and the band was finally removed on the 12th of July. CHASE on Hernia, (Case XXVII., p. 173.)

*January, 1837.*—Day not noted. Case examined by the Chairman. There has been no protrusion since the band was first adjusted. No signs of the sac appear. The linea alba, where the opening was located, is now firm, but not quite so much so as the remainder of that tendinous expansion. The child is active and playful. She is considered radically cured.

*CASE XXI.—Congenital Hernia; truss applied at the age of two months; radical cure in twelve months.*

*April 1st, 1837.* This case is noted in order to show that very young children endure the truss without inconvenience, which is contrary to the opinion expressed in the Preliminary Report. The nurse states that Dr. CHASE applied the little Vento-Inguinal Truss, which was shown by her to the Chairman, when the child was two months old. It is proper to mention that this instrument is preferred in all the varieties of inguinal hernia, occurring in children under five years of age, as it is better adapted than any other to the prominent abdomens and diminutive canals of these little patients. The truss was finally removed at the age of one year. The infant is now fourteen months old. The nurse insists that the truss never occasioned any inconvenience to the child, and very little redness of the part. The block rested directly on the skin for the greater part of the time, but occasionally the nurse inserted beneath it a layer or two of linen. The child is now radically cured. It is scarcely necessary to remind those who have



attempted the employment of trusses, with soft pads, in young infants, how much more severely the skin is usually affected by them.

*CASE XXII.—Common Inguinal Hernia, of many years standing; age of patient 27 years; radical cure in twelve months.*

The facts of this case, so far as the treatment is concerned, are taken from the statement of the patient, a highly intelligent gentleman, and the dates are added from the notes of Dr. CHASE. (CHASE on Hernia, Case XXXI. p. 177.)

The accident occurred in childhood. From the time when the disease was first perceived, to the 20th of January, 1835, a variety of trusses were successively employed, and neither care nor expense was spared in the selection. Not one of these instruments prevented the frequent descent of the bowel. The intestine escaped but once after the first application of CHASE's Inguinal Truss, which was made on the day just mentioned. This protrusion occurred within three days of that time, and led to the employment of an instrument with a stronger spring. The latter was worn without inconvenience, and produced scarcely any irritation. The truss was finally relinquished in January, 1836.

*February 12th, 1837.* Patient seen by the Committee. He states that since he laid aside the instrument he has performed a fatiguing journey to the west on horseback, sometimes travelling fifty miles in a day. He has used much exercise of all kinds, and yesterday inhaled the nitrous oxyde gas. He is muscular and powerful.

The radical character of the cure is most amply proved in this case.

*CASE XXIII.—Common Inguinal Hernia, of four months standing; age of patient about 45 years; radical cure in less than six months.*

*February 26th, 1837.* This patient called at the office of the Chairman. He is by trade a weaver, and stated that he became affected with hernia about the 1st of April, 1836. CHASE's Inguinal Truss was applied August 1st, 1836, and it was finally relinquished a few weeks ago. The man has continued at his trade up to the time of this note.

There are some traces of the secondary hyperemia still remaining on the parts which have been pressed upon by the block. No other external signs of its employment are discoverable.

The external ring, on the affected side, offers much more resistance to the finger, and is much more contracted than that on the other side. The patient is pronounced radically cured.

*CASE XXIV.—Sub-Umbilical Hernia, of many years standing; female about 35 years old; sac globular and pediculated; contraction of orifice and apparent obliteration of the sac; case still pending.*

*Notes by the Chairman. November 29th, 1836.* This female had a hernia through the linea alba, commencing about half an inch below the cicatrix of the umbilicus, and the circular orifice being about half an inch in diameter. The sac was surrounded by integuments much loaded with fat and densely fibrous cellular tissue, forming a globe nearly three inches in diameter, attached by a short pedicle as large as the middle finger.

The bowel filled this sac very readily on slight exertion, and was as

readily reduced. Strangulation had been repeatedly threatened. When the bowel was returned, the sac was found to contain abdominal serum, which could be instantly expressed, but slowly returned on the removal of pressure. The distension was not sufficient to support the weight of the globe, which hung down against the abdomen. CHASE's Umbilical Truss was applied on the orifice, the pedicle being pressed downward out of the way.

*January 13th, 1837.* The tendinous orifice has been contracted to the diameter of three-eighths of an inch. The globular sac has been diminished very considerably. Its pedicle has been thrust down by the pressure of the block, until it appears as if attached entirely below the orifice of sac which has become flattened; while the walls are thicker and the subcutaneous cellular and adipose tissue is much more condensed, so that what was formerly a globe, now strongly resembles a condylomatous tumour, except that the contracted serous lining of the cavity remains apparently unaltered in texture, and has formed no adhesions in the interior. The neck of the sac is probably closed, as there is no appearance of abdominal serum within. When the hernia is cured this excrescence may be safely and readily removed by the knife; for the present it is reverted upward and will be employed like a cushion beneath the block and over the orifice.

This singular hernia may probably have been produced by a small fatty tumour of the peritoneum forcing its way between the fibres of the tendon, and followed by the bowel forcing the tumour with its attachment bodily through the opening. See ABDOMEN, *fatty tumours of*, in the *Amer. Cyclop. of Pract. Med.*

*April 29, 1837.* Examined by the Chairman. The orifice is not discoverable; its site being again concealed by the base of the tumour, since it has been turned up in the form of a flap beneath the block. The sac now appears to be obliterated by adhesion or contraction, and the tumour is inflamed and slightly ulcerated, but gives the patient no pain. The case is from the country, and cannot have the advantage of constant surgical superintendence. Dr. COATES recommended that if the tumour should prove troublesome, it should be removed by the scissors or ligature.

*CASE XXV.—Note by Chairman; Common Inguinal Hernia; Truss applied at the age of fourteen months.*

This note is made merely to illustrate the applicability of trusses to young infants.

*Nov. 18, 1836.* The child is now eighteen months old. He has worn CHASE's Ventro-Inguinal Truss four months, and has never suffered any considerable inconvenience from the pressure of the instrument, although the story of the mother betrays both ignorance and unwarrantable disobedience of orders in the management of it, and in consequence of these circumstances, temporary protrusion has frequently occurred. Still, the child's health, which was previously injured, apparently by abdominal irritations occasioned by the hernia, has been much improved during the action of the truss. The action of the block in this case, as in most instances of common inguinal hernia in young children, was confined to the neighbourhood of the internal and did not extend quite to the external ring. The attempt to approximate the edge too closely to the symphysis pubis, would, probably,

occasion some trouble in the management of the perineal strap. The Committee have never seen ventro-inguinal hernia in very young children.

**CASE XXVI.**—*Inguinal Hernia supposed to be Congenital; age of patient about 22 years; Permanent Retention by Hull's Truss for eight years; Ring not obliterated; Testicle reducible; Cure believed to be radical by the use of Chase's Inguinal Truss in eight months.*

April 8th, 1837. This patient is an intelligent young graduate from the country. His hernia was retained constantly by Hull's Truss for eight years. He believes there was no protrusion in all that time; yet on the day of its relinquishment, the bowel protruded.

He believes that he was then able to return the testicle into the abdomen at will; but in this he may have been deceived by its disappearance beneath the skin of the abdomen. He states that CHASE's Inguinal Truss was applied Feb. 18, 1836. It was worn constantly by day and night until the month of October, 1836—he then relinquished it entirely. This day the parts present no trace of the action of the truss. The external ring is somewhat larger than its fellow the opposite side, but no symptoms of a tendency to protrusion have been present at any time since the moment of relinquishing the instrument.

**CASE XXVII.**—*By Dr. Parrish; Double Hernia; ill health from its imperfect retention with trusses; Chase's Double Truss employed; perfect retention; improved health; case still pending.*

S. M., a lady about thirty-two years of age, applied to me in the summer of 1836, affected with ventro-inguinal hernia on the right side, and common inguinal on the other. She stated that about thirteen years ago she felt something give way while lifting a heavy weight. She felt sick and vomited, and was confined to her bed for several days. On getting up she discovered a small tumour in the left groin. She consulted an eminent surgeon, who applied a truss with a soft pad. She wore this instrument for five years, and it retained the bowel. About eight years ago she went into the country and threw off the truss, but found herself still liable to protrusion in this situation; after which, she took a long walk over a hilly road, and found herself affected with a hernia of the opposite side. She then applied a double truss, which she has worn ever since. During the whole of this period the patient has been subjected to great inconvenience, and frequently to severe attacks of pain from the imperfect retention of the bowel, and from the difficulty of adapting instruments to the parts. Her health is much impaired. She is subject to attacks of colic, poor appetite, pain after eating, &c. I advised a trial of Dr. CHASE's Truss.

7th Mo. 9th, 1836. The patient called to inform me that she had been wearing Dr. CHASE's Double Truss for about four weeks. It produced, for the first few days, great inflammation and soreness about the groins. The parts, however, soon became accustomed to it, and she experienced great relief from the instrument. Her appearance is much improved; her digestion good; she enjoys more comfort than she ever experienced under the use of any other instrument. The bowel is perfectly retained. She finds



it very important to have the instrument accurately adapted. She found some difficulty in accomplishing this at first.

1st Mo. 12th, 1837. S. M. called on me to-day to say that she still continues to wear Dr. CHASE's Truss. Her health is now good; she is entirely free from dyspeptic symptoms; experiences no pain from the instrument, and uses active exercise without causing pain. There has been no descent on the removal of the instrument for three months past. She considers the instrument far superior to any other in point of comfort.

CASE XXVIII.—*By the Chairman. Umbilical Hernia of eight years standing; age of patient ten years; cure believed to be radical in five months.*

Feb. 24th, 1837. This little patient is stated by her mother to have laboured under a small umbilical hernia for eight years. She has been wearing CHASE's Umbilical Truss since the second of December last. No signs of the sac are visible on removing the instrument, but a hernial orifice at the umbilicus admits the tip of the little finger. There are no signs of irritation about the parts pressed upon. The hernia had been prevented from increasing before the use of the truss, by careful bandaging.

April 20th. The patient again examined. The child has been using violent exertion, and the margin of the block has bruised the surrounding skin a little. There is no trace of irritation, but some slight secondary hyperemia is visible. No trace of a hernial orifice can be discovered. The patient is judged by the chairman to be radically cured, but Dr. CHASE declines relinquishing the use of the truss for the present.

CASE XXIX.—*By the Chairman. Inguinal Hernia of two years standing; age of patient 13 years; Radical Cure by Chase's Inguinal Truss in six months.*

April 27th. 1837. This little boy was brought before the Chairman this day. The facts connected with the previous history of the case are taken from the account by the child: the dates are from Dr. CHASE's record.

About two years ago he fell from a tree, astride upon a fence. The accident was soon followed by hernia on the right side, which rapidly enlarged, and the intestine descended into the scrotum. Dr. CHASE states that the finger readily entered the abdominal canal. His Inguinal Truss was applied on the 12th of May, 1836. On the night of the 13th it was laid aside till morning. From the 14th of May till the 7th of November, it was worn constantly, by day and night. Since the last date it has been entirely abandoned.

The two external rings appear now similar in all respects. There have been no symptoms of weakness, and the parts acted upon by the instrument retain no trace of its former presence. This child serves as an errand boy. He is radically cured.

CASE XXX.—*By the Chairman. Congenital Umbilical Hernia; Chase's Umbilical Band applied at the age of two months; cure deemed radical in two months.*

April 28th, 1837. This little patient is now fifteen months old. Before

the age of two months, the usual care in preserving the bowels in place by the hand, by bandage and compresses, and by a belt and soft pad had been tried without obvious effect. The father states that the Umbilical Truss of Dr. CHASE was applied when the child was two months old, and was steadily continued for six weeks, or, at most, two months, since which the case has been left totally unprotected—not the slightest symptom of protrusion of the bowel has occurred.

There is a very slight degree of puffiness about the umbilicus in this case, as though the cicatrix had not yet acquired its greatest degree of firmness; but the accidents of childhood in a vigorous infant, from the age of four to that of fifteen months, are deemed sufficient proof that the cure is radical.

The following highly interesting case was furnished by HENRY BOND, M. D., in reply to a note from the Chairman of the Committee, requesting an account of the particulars.

CASE XXXI.—*Femoral Hernia; supposed sloughing of strangulated omentum; return of hernia after the cicatrization of the abscess.*

On the 9th of April, 1836, I was called to Mrs. M. Y. aged about thirty-four years, who complained of severe pain in the abdomen, and told me she had the cramp colic. I prescribed a full dose of laudanum and castor oil. A few hours after, I called and found that she had been vomiting, and was in no respect better. I was now informed by an attendant of a fact which the patient had refused to communicate, viz: that she had “a lump in her side.”

Upon examination, I found a femoral hernia of the left side, which was with much difficulty reduced by taxis. A truss was applied as soon as it could be procured. I visited her every day, for a short time, to ascertain that the hernia was retained.

On the 16th I was called to see her again, and found her in the same condition as on the 9th. Soon after my last visit the hernia returned while the truss was on, which she immediately removed. After repeated and persevering efforts, and many hours delay, it was again reduced, and the truss again applied.

On the 18th, about mid-day, it suddenly returned, when she was in the street, attended with such violent symptoms that she with difficulty reached her house, which was only at a short distance.

Within an hour I saw her, and again attempted to reduce the hernia, but without success. I attempted, immediately after this, to obtain a consultation, but each of the eminent surgeons to whom I applied was either absent or indispensably engaged. In the evening, two medical friends visited her with me, and reduction was again attempted without success. She was bled copiously; active purgative enemata were repeatedly administered, and, afterwards, opiate enemata. Cold was applied to the hernial tumour, and warm fomentations to the abdomen.

In the forenoon of the 19th, further attempts at reduction were made by myself and by the most competent surgical aid in the city. Vomiting and retching came on soon after the return of the hernia yesterday, and continued all night, accompanied with a pain which occasioned a constant groaning, and prevented sleep entirely until morning, when a short nap was procured by the strong opiate enemata. She has great thirst, and rejects eve-



ry thing swallowed. Pulse very frequent; tongue parched; great heat and tenderness in the abdomen; the tenderness being very great about the umbilicus, but extending over the whole cavity. The hernial tumour is tense and tender, but has less sensibility and pain than the abdomen.

She was told that her case was regarded as hopeless without an operation, and that this, in her case, would be attended with great danger. She promptly decided, as she had done before, that she would not consent to an operation. Attempts at reduction were now discontinued. She remained without any essential change or abatement in her symptoms until the night of the 21st.

On the morning of the 22nd, I found a great change in her condition. The vomiting had ceased, her thirst had abated, and her appetite had returned. The heat, pain, and tenderness in the abdomen, which were unabated yesterday, were now greatly diminished; her countenance has improved, and she has had a slight alvine evacuation. The hernial tumour continues undiminished in size, density and sensibility.

*April 28th.* She has had no return of the vomiting, nor of the heat, pain, and tenderness of the abdomen since the 22nd. The tumour has been increasing very considerably in size, and has been extremely tender, but without any considerable pain so long as the patient is at rest. She has had stools every day, but not without the use of purgatives. The appetite is variable. The patient has been down stairs repeatedly, but is unable to straighten the limb, owing to the tenderness about the top of the thigh. While the tumour has been increasing in size during the last few days, it has become rather softer, and its outline is less distinctly defined. During this day, she has experienced a sharp, burning pain, such as commonly occurs when an abscess is about to open spontaneously. About 9 o'clock, P. M., it burst and discharged a considerable quantity of dark and very fetid matter.

On the 29th, the patient informed me that she had rested well: that this morning she pulled "a core" out of the opening, at least six inches long, and as large as her little finger: that it did not look like other cores, as it was very dark coloured and fetid. I did not see it, but had no doubt, from her description, that it was a part of the omentum.

The discharge rapidly subsided, and the opening healed entirely within ten days. Some stiffness, and inability to produce complete extension of the limb remained a few days after the opening occurred. As soon as the discharge, and the sensibility of the part would admit of it, I applied a truss with a view of consolidating the parts and to insure the certainty of effecting a radical cure.

On the 10th of May, she was so well as to be about, attending to her ordinary laborious occupation. The truss was worn only a very few days, as I was told by some of my surgical friends that it was useless, *as, from the condition of the parts, there must necessarily be a radical cure without the application of a truss.*

*July 3d.* I was again called, and found that she had very great pain in the left groin, extending into the iliac region. She had nausea and obstruction of the first passages. There was a tumour in the groin, below Poupart's ligament, about the size of a marble. I made some attempts to reduce it, but without success, and had some doubts whether it was a hernia. I directed v. s.  $\S$ xviii. copious purgative enemata, and afterwards a large



dose of castor oil. In a little time she was relieved of the pain and the tumour disappeared.

*July 31st.* The hernia returned yesterday, and was so painful as to prevent any sleep last night. I was called at 1, P. M. The tumour has become larger to-day and more painful, and she has been vomiting all the forenoon. She has had no stool since yesterday morning. The tumour is just below, and parallel with Poupart's ligament, and is about the size of the last joint of my thumb, firm, and painful on pressure. The patient complains of great pain in the abdomen, chiefly in and above the left iliac region. I directed a copious and active purgative enema to be followed by a cathartic draught; called again, in a short time, with a medical friend, and found her in no degree relieved; directed two dozen leeches to be applied to the tumour, and afterwards cold to be applied; ordered a strong purgative enema, and after that operated, a large dose of castor oil. After the use of these remedies she became a little easier. At a little past midnight she ceased vomiting, and had a stool.

*August 1st.* In the morning I found the tumour soft, and it was reduced without difficulty.

Since the last date, the hernia has reappeared several times in spite of the different trusses she has made use of. She has generally succeeded in returning it herself; but, on three occasions, it has been attended with the same distress and difficulty as on the 31st of July.

One chief reason why the trusses have not been more effectual is, that her occupation obliges her frequently to carry heavy burdens, and to pass up and down a very steep flight of steps.

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ON THE

CONSTRUCTION OF INSTRUMENTS

AND

RADICAL CURE OF HERNIA.

WITH NOTES, ILLUSTRATIONS, AND ADDITIONAL CASES;

Concluding with a tabular statement of 200 cases, extracted from "A Treatise on the Radical Cure of Hernia by Trusses, by HEBER CHASE, M. D., *Member of the Academy of Natural Sciences, Honorary Member of the Philadelphia Medical Society, etc.*

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